

FIELD INVESTIGATION TEAM ACTIVITIES AT  
UNCONTROLLED HAZARDOUS SUBSTANCES  
FACILITIES — ZONE I

NUS CORPORATION  
SUPERFUND DIVISION

R-585-10-0-14

SITE INSPECTION OF  
ST. ELIZABETH'S HOSPITAL  
PREPARED UNDER

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EPA NO. DC-14  
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U.S. ENVIRONMENTAL PROTECTION AGENCY

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## SECTION 1

## 1.0 INTRODUCTION

### 1.1 Authorization

NUS Corporation performed this work under Environmental Protection Agency Contract No. 68-01-7346. This specific report was prepared in accordance with Technical Directive Document No. F3-9005-31 for the St. Elizabeth's Hospital site, located in Washington, D.C.

### 1.2 Scope of Work

NUS FIT 3 was tasked to conduct a site inspection of the subject site.

### 1.3 Summary

St. Elizabeth's Hospital is located along Martin Luther King, Jr. Avenue in southwestern Washington, D.C. Since 1977, various portions of the hospital property have been used by the District of Columbia Solid Waste Disposal Division of the Department of Public Works as permitted landfill areas. Fill material included storm sewer cleanings, street sweepings, road construction debris (including milled asphalt), and incinerator fly ash residue.

The subject landfill area is approximately 20 acres in size, with an average depth of 40 feet. This landfill area was in operation from October 1982 to October 1989. Three areas within the subject landfill were closed and capped, in 1983, 1987, and 1988. The remaining fill area was closed and capped in October 1989; use of the landfill was discontinued at this time.

In March 1985, by request of the EPA Region III Waste Management Division, because of the incinerator fly ash residue that was deposited on site, the Central Regional Laboratory (CRL) performed comprehensive sampling of the fill materials. Extensive dioxin sampling was performed, and trace but negligible levels of chlorinated dioxins were revealed. Sampling in November 1985 revealed elevated levels of heavy metals, including lead and cadmium, in soil and ash samples. Some low levels of organic contaminants were also revealed in leachate and sediment samples. Fly ash samples obtained in December 1988 were found to be EP toxic for lead and cadmium. No remedial action has taken place to date.

Surface water and groundwater are the sources of potable water in the study area. Five public water supply companies provide water to a major portion of the population within the three-mile radius. These companies obtain water from various surface water intakes, all of which are either upstream of the site or outside the surface drainage pathway of the site. The Colebrooke Development utilizes a well approximately 2.25 miles from the site for public water and serves about 3,337 people. Three domestic wells have been identified within the study area; the closest well is 2.5 miles south of the site. The total population dependent on groundwater within the 3-mile radius is 3,348 people.

FIT 3 conducted a site inspection at St. Elizabeth's Hospital on June 27, 1990. Activities included sampling on-site soils, sediment, and surface water and off-site sediment and surface water. A detailed Quality Assurance Review and a Toxicological Evaluation of the sample results from this inspection can be found in sections 7.0 and 8.0, respectively.

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## SECTION 2

## **2.0 THE SITE**

### **2.1 Location**

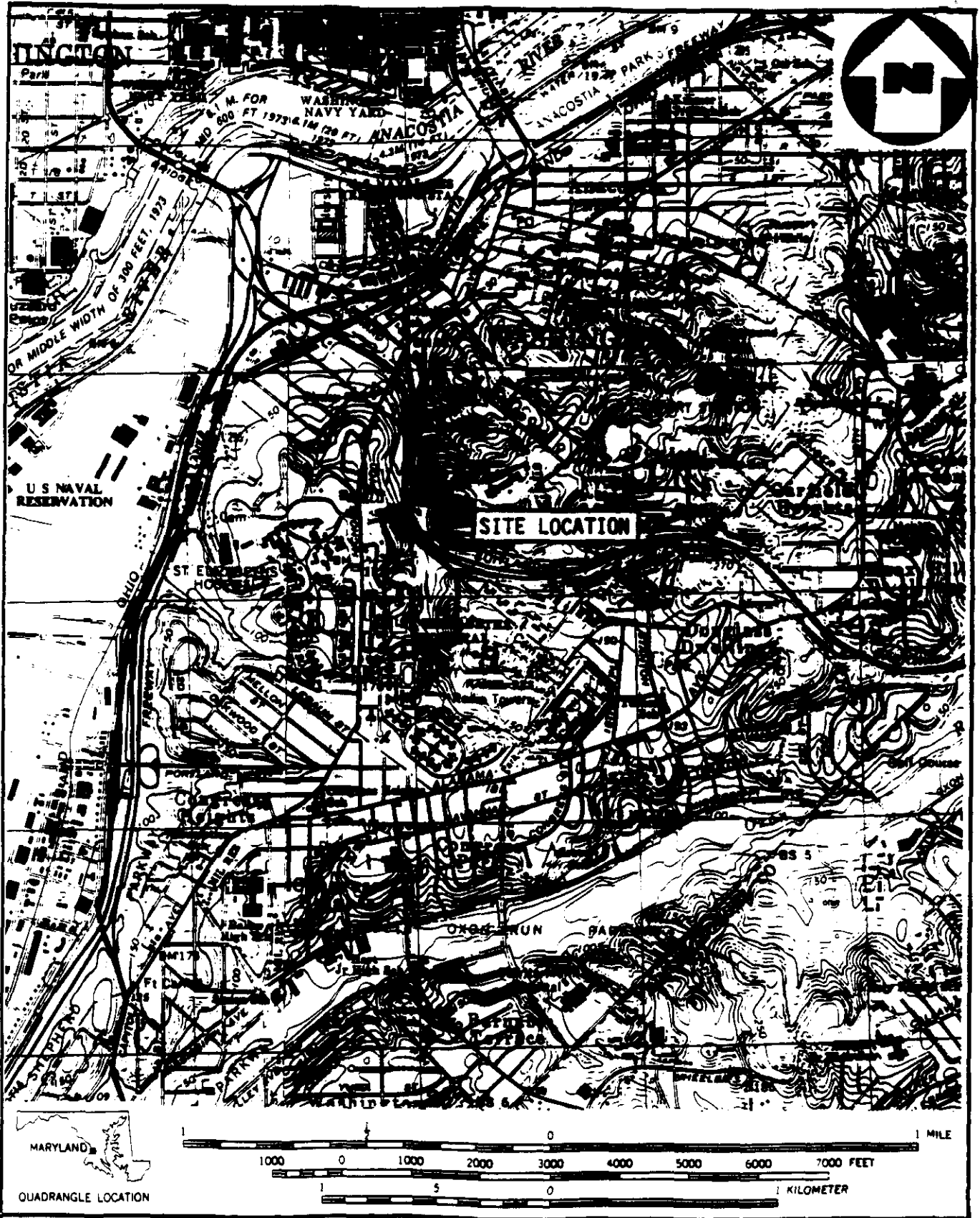
The St. Elizabeth's Hospital site is located at 2700 Martin Luther King, Jr. Avenue in Washington, D. C. (see figure 2.1, page 2-2). The coordinates of the site are north 38° 51' 05" latitude and west 76° 59' 35" longitude. The site may be located on the United States Geological Survey (U.S.G.S.) Anacostia, D. C. - Maryland quadrangle 7.5 minute series topographic map by measuring one inch east and 4.5 inches south from the northwestern corner of the map.<sup>1</sup>

### **2.2 Site Layout**

The St. Elizabeth's Hospital landfill is located in the northeastern section of the hospital property. It is about 20 acres in size and has an average depth of approximately 40 feet. The landfill is oriented in southward to northward direction and is bordered on the west by Martin Luther King, Jr. Avenue and on the east by Suitland Parkway (see figure 2.2, page 2-3). Access to the site is restricted by a six-foot fence with two locked gates. Entrance gate no. 3 to the fenced hospital property is in the southwestern corner of the site. A second locked access gate is on the northern edge of the property on a dirt access road. A third gate, which is usually open, is inside the entranceway from the locked gate.<sup>1,2,3,4,5,6</sup>

Dunbar Road runs northwardly from Martin Luther King, Jr. Avenue; the old dirt truck access road to the fill area is off Dunbar Road. A pathway is located between Dunbar Road and the dirt access road.<sup>1,2,4</sup>

The fenced hospital property includes several major features. Two areas with hospital buildings and parking lots can be found within the fencing; one is in the northwestern corner of the property and the other is in the southwestern corner. Office trailers are located directly south of the northwestern hospital building area. Hospital maintenance garages are located directly north of the southwestern hospital building area. A motor pool parking lot is situated between the maintenance garages and the office trailers.<sup>1,2,3,4</sup>



SOURCE: (7.5 MINUTE SERIES) U.S.G.S. ALEXANDRIA, VA-D.C.-MD. & ANACOSTIA, MD.-D.C. QUADS

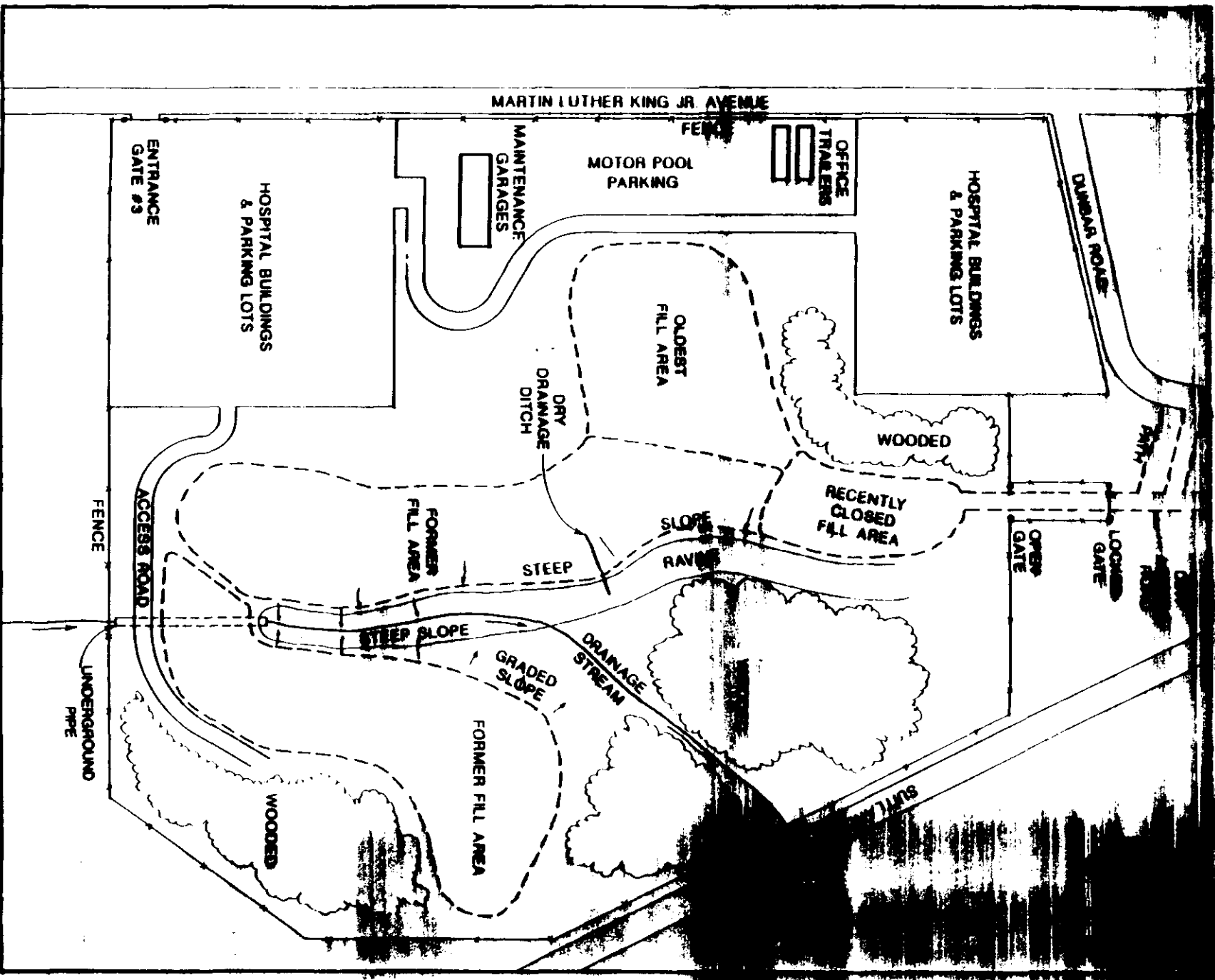
### SITE LOCATION MAP

FIGURE 2.1

ST. ELIZABETHS HOSPITAL SITE, WASHINGTON, D.C.

SCALE 1:24000





SITE SKETCH

ST. ELIZABETHS HOSPITAL SITE, WASHINGTON D.C.

( NO SCALE )

FIGURE 2.2

The landfill comprises the major portion of the fenced hospital property. There are four fill areas within the landfill. The recently closed fill area is the most northern. The oldest fill area is southwest of the recently closed fill area and east of the motor pool parking lot. The two former fill areas form the southernmost section of the landfill. A steeply sloped ravine divides these two fill areas. A dirt access road enters the southern fill areas from a hospital parking lot near the southern border of the landfill.<sup>1,4,5</sup>

A drainage stream of hospital property runoff enters the site from the south and travels through a pipe under the eastern former fill area and into the steep ravine. The stream flows northwardly through the ravine for several hundred feet and then veers to the northeast and exits from the site near Suitland Parkway. The stream flows about 100 feet into a culvert under the parkway.<sup>1,4,5</sup>

Several wooded areas are located within the fenced property around the fill areas: one on the northern side and one on the southern side of the easternmost former fill area and one between the recently closed fill area and the northwestern area of the hospital buildings and parking lots.<sup>1,2,4</sup>

### **2.3 Ownership History**

According to Richard Smith, of the District of Columbia Department of Public Works, St. Elizabeth's Hospital has been in operation since sometime during the Civil War. The hospital was a federally owned and operated mental institution until 1987. In 1987, the hospital was turned over to the District of Columbia, which currently owns and operates the facility and the surrounding property.<sup>3</sup>

### **2.4 Site Use History**

St. Elizabeth's Hospital is currently owned and operated by the District of Columbia. Several different areas within the hospital's property have been used as fill areas since 1977. The subject area was operated as a solid waste landfill from 1982 until 1989 by the District of Columbia Department of Public Works, Solid Waste Division. The use of these landfill areas before 1977 is unknown.<sup>3,7</sup>

There are four fill areas in the subject landfill. Fill material in each of these areas included storm sewer cleanings, street sweepings, road construction debris (including milled asphalt), and incinerator fly ash, according to Mr. Smith. The fly ash was taken from the District of Columbia Solid Waste Reduction Center's (SWRC) electrostatic precipitators and was generated from the incineration of domestic waste. The fly ash comprised approximately 60 percent of the total fill material and was uniform in nature, according to Mr. Smith. All material was transported to the site in dump trucks with 10-cubic-yard capacities. According to Mr. Smith, a total of six to eight truckloads of material were deposited at the landfill daily; three to four of these truckloads were ash residue.<sup>3,5,7</sup>

The 4 fill areas have been capped with approximately 18 to 30 inches of a mixture of milled asphalt, soils, and compost from a sewage treatment plant. Most of the areas were also seeded and are currently overgrown with vegetation. The oldest fill area, which was capped in 1983, is unvegetated; parts of it are used as parking areas for hospital vehicles. The westernmost former fill area was capped in 1987 and the easternmost was capped in 1988. The recently closed fill area was closed in October 1989. According to Mr. Smith, closure plans for the landfill were approved by the District of Columbia's Department of Consumer and Regulatory Affairs after the area was closed.<sup>3,5,6,7</sup>

## **2.5 Permit and Regulatory Action History**

The District of Columbia Department of Public Works, Solid Waste Disposal Division, disposed waste on the St. Elizabeth's Hospital site under license no. 1-83. The revocable license, granted by the United States government, allowed the District of Columbia Department of Environmental Services to use the hospital land for the purpose of depositing earth fill.<sup>3,8</sup>

When this license was issued, on October 19, 1982, the hospital property was federally owned. In 1987, St. Elizabeth's Hospital and the surrounding property were acquired by the District of Columbia from the federal government. This license, overseen by the St. Elizabeth's Hospital Administration, remained in effect subject to the provisions and conditions outlined therein. This license was the only permit held by the District of Columbia to dispose solid waste on the St. Elizabeth's Hospital property. Although a review and an update of this license were planned, no action was taken because the active fill was closed in October 1989.<sup>2,7</sup>

The District of Columbia was also permitted, through a similar license (no. 78-1), in October 1977 for landfill practices in a smaller area of the St. Elizabeth's Hospital property. This area is west of Martin Luther King, Jr. Avenue and the current fill area. This former fill area remained active until 1982. After closure of this area, license 1-83 was granted for continued landfill activities at the subject site. Copies of both licenses can be found in appendix C.<sup>3,8,9</sup>

Fly ash samples taken in 1984 from the SWRC electrostatic precipitators were found to contain trace levels of chlorinated dioxins and furans (tetra to octa isomers) (see appendix D). As a result of these findings, by request of EPA Region III Waste Management Division, CRL performed dioxin sampling on March 6, 7, and 8, 1985 at the subject site. Fill material samples were collected from throughout the landfill. Samples were also collected from three leachate streams located southeast of the site. Sediment samples were taken from a small temporary collection pond and an intermittent stream that received surface runoff and leachate from the aforementioned leachate streams. No 2,3,7,8-tetrachlorodibenzo-p-dioxin (2,3,7,8-TCDD) was detected in the leachate samples. The highest reported value for 2,3,7,8-TCDD in solid samples was 0.047 ppb in an ash sample (see appendix E).<sup>6,10,11,12,13</sup>

Additional sampling of the leachates and sediments from the streams and pond was conducted in November 1985; priority pollutant and dioxin analyses were conducted (see appendix F). Inorganic solid and aqueous samples from these locations show elevated levels of heavy metals. Organic analysis of leachate aqueous and sediment samples revealed trace to low levels of phenol (up to 110 ug/l and 790 ug/kg, respectively) and low levels of polyaromatic hydrocarbons (PAHs). Pond sediments revealed somewhat higher levels of PAHs and 340 ppb of polychlorinated biphenyl (PCB) 1260.<sup>15,16</sup>

Further EPA sampling in December 1988 revealed that several ash samples and the furnace residue and electrostatic precipitator ash were EP toxic for lead (up to 23 ppm) and/or cadmium (up to 8.45 ppm).<sup>17</sup>

## **2.6 Remedial Action to Date**

A memorandum pertaining to the dioxin sampling at St. Elizabeth's Hospital, from the acting director of Health Assessment at the United States Department of Health and Human Services, stated the following conclusion: surface soil levels of 2,3,7,8 TCDD and other polychlorinated dioxins and furans present at the site should not pose a public health threat to employees, patients, residents, or landfill workers. However, since polychlorinated dioxins and furans may exist at levels of concern at depths greater than one foot, it was recommended in the memo that future construction in the fill area or a land use change should be preceded by core sampling. No remedial action has been taken to date.<sup>3</sup> For further analysis and conclusions of the 1985 sample data for the subject site, see appendix E.<sup>3,5,13,14</sup>

### SECTION 3

### 3.0 ENVIRONMENTAL SETTING

#### 3.1 Water Supply

Surface water and groundwater are the sources of potable water for individuals in the four-mile-radius area around the St. Elizabeth's Hospital site. Private domestic wells, one community development well, and four water companies serve individuals in the study area. All individuals not served by a water company are assumed to maintain private domestic wells.<sup>18,19</sup>

The District of Columbia Water and Sewerage Commission (DC) serves an estimated 1.1 million people in Washington, D.C. A portion of the DC distribution area falls within the study area. DC obtains water from two surface water intakes: the Great Falls intake and the Little Falls intake. The Great Falls intake is located approximately 17 miles northwest and upstream of the site on the Potomac River. The Great Falls intake is gravity fed and is used primarily during winter months. The Little Falls intake is located at Little Falls Dam, approximately 10.5 miles northwest and upstream of the site on the Potomac River. The Potomac River receives drainage from the site via the Anacostia River, downstream of the two DC surface water intakes. The DC system is integrated. The DC system is connected to the Washington Suburban Sanitary Commission (WSSC) system and sells water to Arlington County and Falls Church. DC does not purchase water from any other water company.<sup>20</sup>

The Arlington County Water Company (ACWC) serves an estimated 35,000 people in Arlington County, Virginia with water purchased from DC. A portion of the ACWC distribution area falls within the study area. In cases of critical need, ACWC can interconnect with Fairfax County and Falls Church.<sup>21</sup>

The Virginia American Water Company (VAWC) serves an estimated 30,000 customers in the city of Alexandria and an estimated 10,000 to 12,000 customers in the city of Dale. A portion of the city of Alexandria falls within the study area. VAWC purchases water from the Fairfax County Water Authority (FCWA) and maintains two wells for emergency back-up use. The two VAWC wells are located 5.25 miles southwest of the site in the city of Alexandria and were last used during a drought in 1988.<sup>22</sup>

FCWA serves an estimated 400,000 people in Fairfax County, Virginia and sells water to the city of Alexandria and to Arlington, Prince William, and Loudoun Counties in Virginia. FCWA obtains water from two surface water intakes. The Occoquan intake (and reservoir) is located approximately 20 miles southwest of the site on the Occoquan River. Water from the Occoquan reservoir is treated at the Lorton Treatment Plant and is distributed to the cities of Annandale, Springfield, and Alexandria and Prince William County in Virginia. The Occoquan River does not receive drainage from the site. The second intake is located approximately 17 miles northwest and upstream of the site on the Potomac River. Water from the Potomac River intake is treated at the Corbalis Treatment Plant and is distributed to the cities of Herndon, Chantilly, and Centerville and to Fairfax and Loudoun Counties in Virginia. The Potomac River receives surface drainage from the site via the Anacostia River downstream from the surface intake. The FCWA system is not integrated. FCWA owns 19 community water wells; the wells are not in use and are currently in the process of being capped.<sup>23,24</sup>

WSSC serves an estimated 1.3 million people in Prince George's and Montgomery Counties, Maryland. A portion of the WSSC distribution area falls within the study area. WSSC obtains water from two surface water intakes. One intake is located at Rocky Gorge Dam, approximately 19 miles north-northeast of the site on the Patuxent River. The Patuxent River does not receive surface drainage from the site. The other intake is located near Swains Lock, approximately 18 miles northwest and upstream of the site on the Potomac River. The Potomac River receives surface drainage from the site via the Anacostia River downstream from the surface intake. In addition, WSSC maintains 55 filtered water storage facilities at various points along the WSSC distribution system in order to meet peak customer demands and to provide a reserve supply for fire protection. WSSC has an interconnected water distribution pipeline so that some areas receive water from both surface sources. WSSC is interconnected with DC.<sup>20,25,26</sup>

One well in the study area is listed as producing water for public supply use from an aquifer developed in the Cretaceous Potomac Group. The well is located in the Colebrooke Development (CD), approximately 2.25 miles east-southeast of the site and serves approximately 3,337 people. The CD well was drilled to a total depth of 620 feet and has a measured static water level of 255 feet and a reported yield of 50 gallons per minute (gpm).<sup>19,27</sup>

By law, no private domestic, commercial, or industrial well is permitted in the District of Columbia. Three domestic wells have been identified from the well records of Prince George's County in the study area outside of Washington, D.C (see appendix G). The wells reached total depths of 327, 330, and 312 feet, had water levels of 200, 190, and 195 feet, respectively, and had reported yields of 10, 10, and 40 gpm, respectively. All three wells are reported to produce from aquifers developed in the Cretaceous Potomac Group. Two wells, located 2.5 miles south and 2.5 miles south-southeast of the site, are the nearest wells identified as producing water for domestic use. The total population dependent on groundwater within the 3-mile radius is 3,348 people. This figure was obtained by adding the population served in the Colebrooke Development to the population using domestic wells, which is based on a home count multiplied by 3.8 persons.<sup>19,27,28</sup>

### 3.2 Surface Waters

Surface waters from the subject site follow topographic contours and flow chiefly toward the drainage stream between the two former fill areas. This drainage stream flows into a storm sewer located along Suitland Parkway about 100 feet east of the property fenceline. The point of discharge of this sewer is not known. The storm sewer could not be identified on the sewer and storm line maps for that area, according to a representative of the District of Columbia Government Department of Public Works.<sup>2,4,29</sup>

The Anacostia River is located approximately one mile north of the site and empties into the Potomac River, which is located approximately one mile to the west. The Anacostia and Potomac Rivers are used for recreational and industrial purposes. A riverine tidal wetland, approximately 100 acres in size, is located about 3 stream miles downstream on the Potomac River; it is the closest wetland to the site that is within the site's surface drainage pathway. Within one mile south of the site is Oxon Run, which flows approximately three stream miles to the southwest before entering the Potomac River.<sup>1,30</sup>

### 3.3 Hydrogeology

The geologic and hydrogeologic conditions in the study area were researched as part of the site inspection. A preliminary literature review was conducted to determine surface and subsurface geologic conditions, soil character, and the status of groundwater transport and storage.

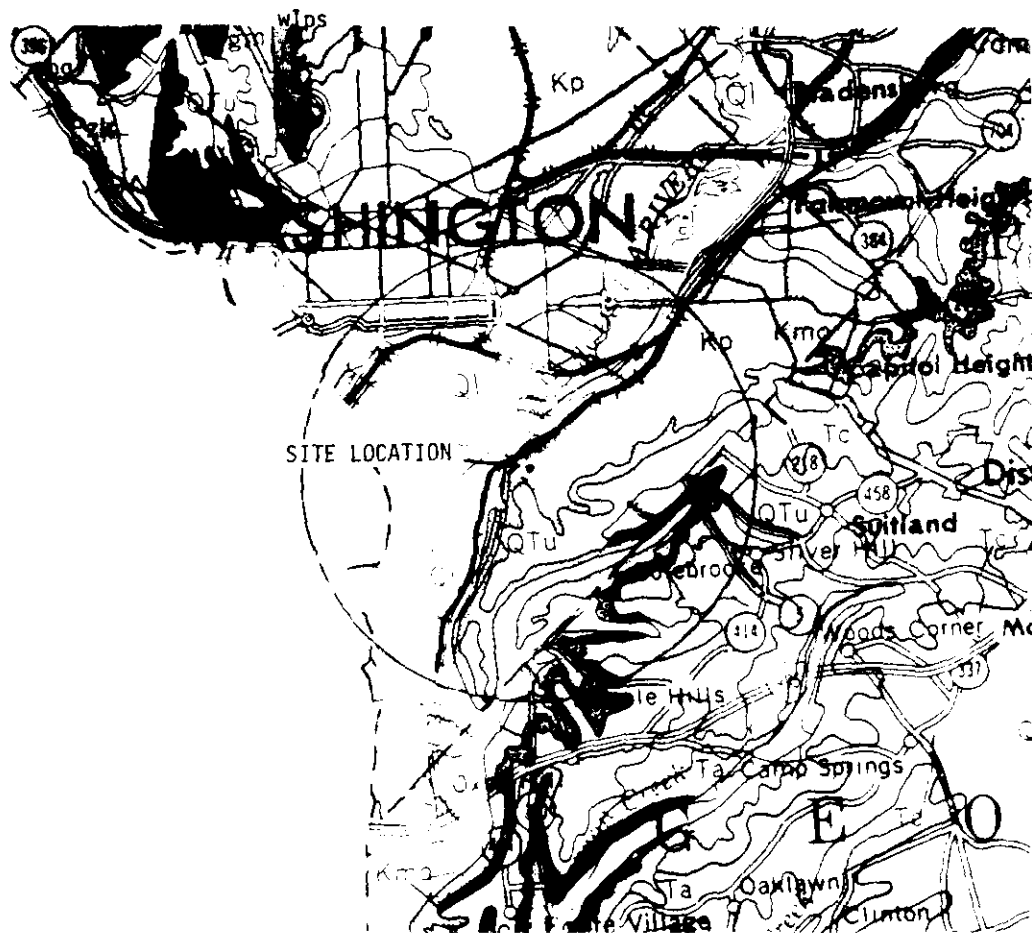
### 3.3.1 Geology

The St. Elizabeth's Hospital site and study area are situated in the Western Shore subdivision of the Coastal Plain Physiographic Province. The Coastal Plain extends from New England southward through eastern Florida, and in Maryland has been subdivided into subaerial and submerged portions. The boundary between the subaerial and the submerged portions of the Coastal Plain is broken and sinuous, especially in the Chesapeake Bay area. The present topographic expression of the subaerial Coastal Plain is the result of extensive fluvial dissection; the Coastal Plain is dominated by a mature dendritic drainage pattern. East of Chesapeake Bay, the Coastal Plain resembles a nearly level plain. West of the bay, it is more rolling and dissected. The eastern limit of the Coastal Plain is the edge of the continental shelf, which in Maryland is located about 100 miles offshore in 600 feet (100 fathoms) of water. The boundary between the Coastal Plain Physiographic Province and the Piedmont Physiographic Province to the west and north is sinuous and poorly defined. This boundary, known as the Fall Line, is represented by the feathering of Cretaceous and Quaternary age formations as they onlap onto the crystalline rocks of the Piedmont. The Fall Line is located about 4.5 to five miles northwest of the site.<sup>1,31,32</sup>

The Coastal Plain is underlain by a series of southeastward-dipping, wedge-shaped sheets of relatively unconsolidated Cretaceous and Quaternary age sediments. Approximately 25 percent of the study area is underlain by Cretaceous sediments, 10 percent by Tertiary sediments, and 45 percent by Quaternary sediments (see figure 3.1, page 3-5). About 20 percent of the study area is covered by water.<sup>32,33</sup>

The St. Elizabeth's Hospital site is underlain by the Cretaceous Potomac Group, undifferentiated. The Potomac Group, undifferentiated, consists of interbedded quartzose gravel, protoquartzite and orthoquartzite, argillaceous sand, and white, dark gray, and multicolored silt and clay. The rapid lensing of bedding that characterizes all lithofacies developed in the Potomac Group is consistent with deposition in an alluvial environment. The Potomac Group, undifferentiated, ranges in thickness from 0 to 800 feet. In other areas, the Potomac Group has been subdivided into, in descending order, the Raritan and Patapsco Formations, the Arundel Clay, and the Patuxent Formation. The Raritan and Patapsco Formations range in thickness from 0 to 400 feet and consist of gray, brown, and red variegated silt and clay and lenticular, crossbedded, argillaceous sand with minor gravel. The Arundel Clay ranges in thickness from 0 to 100 feet and consists of dark gray and maroon, lignitic clay with abundant siderite concretions. The Patuxent Formation ranges in thickness from 0 to 250 feet and consists of white or light gray to orange-brown, crossbedded, argillaceous, sand and quartz gravel with minor silt and clay. No consistent upper or lower boundaries for the formations in the Potomac Group have been mapped in the study area.<sup>32,33</sup>

- |     |                                 |     |                                             |
|-----|---------------------------------|-----|---------------------------------------------|
| Ql  | Lowland Deposits                | Kp  | Potomac Group                               |
| QTu | Upland Deposits (Western Shore) | Pzk | Kensington Quartz Diorite                   |
| Tc  | Calvert Formation               | gm  | Georgetown Mafic Complex                    |
| Ta  | Aquia Formation                 | wbg | Wissahickon Formation, Boulder Gneiss       |
| Km  | Monmouth Formation              | wls | Wissahickon Formation, Lower Pelitic Schist |



0 5 10 Miles

Source: Geologic Map of Maryland, 1968.

FIGURE 3.1

GEOLOGIC MAP  
ST. ELIZABETH'S HOSPITAL SITE  
Washington, D.C.



The Cretaceous Monmouth Formation stratigraphically overlies the Potomac Group in the study area and has been mapped 1.25 miles southeast of the site. The Monmouth Formation ranges in thickness from 0 to 100 feet and consists of dark gray to reddish-brown, micaceous, glauconitic, argillaceous, fine- to coarse-grained sand. A basal gravel has been mapped in Prince George's County.<sup>32,33</sup>

The Miocene Calvert Formation stratigraphically overlies the Monmouth Formation in the study area and has been mapped 0.5 mile southeast of the site. The Calvert Formation ranges in thickness from 0 to 150 feet and has been subdivided into 2 members, the Plums Point Member and the Fairhaven Member. The Plums Point Member consists of interbedded dark green to dark bluish-gray, fine-grained argillaceous sand and sandy clay with prominent shell beds and locally silica-cemented sandstone. The Fairhaven Member consists of greenish-blue diatomaceous clay, greenish-blue sandy clay, and pale brown to white, fine-grained argillaceous sand.<sup>32,33</sup>

Quaternary deposits unconformably overlie Tertiary and Cretaceous age sediments in the study area. In the Coastal Plain area of Maryland, the Quaternary deposits have been subdivided into Lowland Deposits and Upland Deposits. The Lowland Deposits have been mapped 0.25 mile northwest of the site and consist of brown to dark gray, lignitic silty clay, varicolored silt and clay, and medium- to coarse-grained sand and gravel. Cobbles and boulders are common near the base of the deposits. The Lowland Deposits range in thickness from 0 to 150 feet and commonly contain reworked Eocene glauconite and marine to estuarine faunas. The Lowland Deposits include, in part, the Pamlico, Talbot, Wicomico, and Sunderland Formations of earlier workers.<sup>32</sup>

The Quaternary Upland Deposits have been subdivided into an Eastern Shore and a Western Shore, separated by the Chesapeake Bay. The Upland Deposits (Western Shore) have been mapped less than 0.25 mile south of the site and consist of orange-brown sand and gravel, with minor silt and red, white, or gray clay. Locally, the sands and gravels may be limonite cemented. A lower gravel member and an upper loam member of the Upland Deposits (Western Shore) have been mapped in southern Maryland. The Upland Deposits (Western Shore) range in thickness from 0 to 50 feet and include, in part, the Brandywine, Bryn Mawr, and Sunderland Formations of earlier workers.<sup>32</sup>

The nature of the crystalline rocks underlying the Cretaceous and Quaternary sediments in the study area is unknown but is assumed to be similar to the crystalline rocks that crop out at or near the Fall Line. Crystalline bedrock crops out about 4.5 to five miles northwest of the site and include the Georgetown Mafic Complex, the Kensington Quartz Diorite, the Boulder Gneiss facies of the Wissahickon Formation, and the Lower Pelitic Schist facies of the Wissahickon Formation.<sup>32,33</sup>

### 3.3.2 Soils

Soils underlying Washington, D.C. have not been mapped and are assumed to consist of disturbed soil and landfill material. No permeability, available moisture capacity, or soil reaction data are available for this area.

Eight soil samples were taken by NUS FIT 3 personnel during the June 27, 1990 site visit. Soils ranged from light brown to dark brown in color and from sandy loam to clayey silt in texture.<sup>4</sup>

### 3.3.3 Groundwater

Groundwater in the study area occurs in and moves through interconnected intergranular openings in the unconsolidated deposits and through secondary openings, such as joints and fractures, in the underlying crystalline bedrock. Groundwater in the Coastal Plain area may be under confined or unconfined conditions. No regionally persistent confining beds have been documented in either the unconsolidated sediments or the crystalline bedrock within the study area. For this reason, all the aquifers within the study area are considered to be regionally, hydraulically interconnected. Groundwater recharge is by the infiltration of local precipitation, and groundwater discharge occurs at wells, seeps, springs, and streams. Palustrine, riverine, and lacustrine wetlands have been identified in the study area. Mapped palustrine wetlands include forested, shrub/scrub, emergent and open water. Riverine wetlands include lower perennial open water, tidal open water, tidal emergent, and tidal flat. Lacustrine wetlands include littoral emergent. The nearest wetlands of greater than five acres in area are located 0.5 mile south of the site on Oxon Run and have been identified as palustrine forested. The wetlands are hydraulically interconnected with the shallow aquifers and serve as additional discharge points. These wetlands are outside the surface drainage pathway.<sup>1,4,30,32</sup>

The site is underlain by unconsolidated sediments of the Potomac Group. The Patapsco and Patuxent Formations (Potomac Group) are considered important water-bearing formations in Prince George's County and are capable of yielding sufficient quantities of water for most uses. The Arundel Clay, which separates the Patapsco Formation from the Patuxent Formation in other areas, may serve as an aquitard. Twenty wells are listed as producing water from aquifers developed in the Potomac Group near the study area. Eleven of the 20 wells produce water for industrial and/or commercial use, 5 produce water for domestic use, and 1 produces water for public supply use. Three of the 20 wells are listed as observation wells, and 1 is listed as a test well. The well depths for the 11 industrial and commercial wells range from 18 to 620 feet; the median well depth is 376 feet. The measured static water levels reported for 7 of the 11 industrial and commercial wells range from 95 to 210 feet; the median depth is 180 feet. The yields reported for 9 of the 11 industrial and commercial wells range from 5 to 85 gpm; the median yield is 32 gpm. The specific capacity reported for 7 of the 11 industrial and commercial wells ranges from 0.1 to 0.9 gpm per foot of drawdown; the median specific capacity is 0.6 gpm per foot of drawdown. The well depths for the 5 domestic wells range from 312 to 875 feet; the median depth is 330 feet. The measured static water levels reported for the 5 domestic wells range from 150 to 200 feet; the median depth is 190 feet. The yields reported for 4 of the 5 domestic wells range from 10 to 40 gpm; the median yield is 15 gpm. The specific capacity reported for four of the five domestic wells ranges from 0.1 to 1.1 gpm per foot of drawdown; the median specific capacity is one gpm per foot of drawdown. The public supply well was drilled to a total depth of 620 feet and has a measured static water level of 255 feet, a reported yield of 50 gpm, and a specific capacity of 0.4 gpm per foot of drawdown. The 3 observation wells are owned by WSSC and were drilled to 603, 630, and 684 feet. The measured static water levels reported for the observation wells are 100, 102, and 173 feet, respectively, the reported yields are 439, 540, and 700 gpm, respectively, and the specific capacities reported are 1.8, 4.4, and 9.4 gpm per foot of drawdown, respectively. The test well is also owned by WSSC and was drilled to 288 feet. The test well is screened in 2 intervals and has reported measured static water levels of 56 feet and 245 feet and reported yields of 136 and 265 gpm, respectively.<sup>19,33</sup>

No wells are listed as producing water from aquifers developed in the Cretaceous Monmouth in Prince George's County or from aquifers developed in the Miocene Calvert Formation or Quaternary deposits in the study area.<sup>19</sup>

Aquifers developed in the Calvert Formation in Prince George's County are capable of producing sufficient quantities of water for domestic and small industrial or commercial use. Forty-three wells are listed as producing water from aquifers developed in the Calvert Formation in Prince George's County. Thirty-nine of the 43 wells produce water for domestic use, 3 wells produce water for industrial use, and 1 well produces water for commercial use. The well depths for the 39 domestic wells range from 11 to 85 feet; the median depth is 47 feet. The measured static water levels for 38 of the domestic wells range from 9 to 67 feet; the median depth is 30 feet. The yields reported for three of the domestic wells are three, two, and two gpm. The well depths for 2 of the 3 industrial wells are 15 and 52 feet. Neither static water levels nor yields were reported for the industrial wells. The commercial well was drilled to a total depth of 52 feet and has a measured static water level of 32 feet. No yield was reported for the commercial well.<sup>19</sup>

Aquifers developed in the Quaternary deposits in Prince George's County are capable of producing sufficient quantities of water for domestic and small industrial or commercial use. Two wells are listed as producing water from aquifers developed in Quaternary deposits in Prince George's County. One of the wells produces water for domestic and stock use, and one well produces water for industrial use. The domestic and stock use well was drilled to a total depth of 60 feet and was reported as having an inadequate yield. Neither the static water level nor the yield were reported for the domestic and stock well. The industrial well was drilled to a total depth of 26 feet and has measured static water level of 16 feet. No yield was reported for the industrial well.<sup>19</sup>

The direction of groundwater flow beneath the St. Elizabeth's Hospital site is unknown. The direction of groundwater flow beneath the site, based on topographic observations and the role of streams in groundwater discharge, is northeastwardly toward a small northward-trending gully. The depth to groundwater beneath the site is unknown. The depth to groundwater beneath the site is estimated to be less than 150 feet, which reflects the maximum elevation of the site above the Anacostia River. The depth to bedrock beneath the site is unknown.<sup>1</sup>

### **3.4 Climate and Meteorology**

The subject site is located within the continental climate of the United States. The annual temperature for College Park, Maryland, which is located approximately 10 miles northeast of the site, is 56°F. The average monthly temperatures range from 34°F in January to 77.2°F in August. The average annual precipitation for College Park is 42.73 inches. The average monthly precipitation ranges from 2.79 inches in February to five inches in August. The mean annual lake evaporation for the area of the site is approximately 36 inches. The net annual precipitation for the site area is approximately 6.73 inches. A 1-year, 24-hour rainfall will produce approximately 2.7 inches of rain.<sup>34,35,36</sup>

### 3.5 Land Use

St. Elizabeth's Hospital occupies approximately 50 acres west and south of the fill area. Other land use within three miles of the site consists primarily of residential communities. The site lies in the southwestern corner of the District of Columbia. The Anacostia River runs from northeast to southwest through the study area. The Potomac River runs from north to south and marks the border between Maryland and Virginia. Several military installments, including United States Naval facilities and Bolling Air Force Base, are located along the Maryland side of the Potomac. Downtown Washington is located within three miles northwest of the site.<sup>1,2,3</sup>

### 3.6 Population Distribution

The population within a 3-mile radius of the subject site is estimated to be as follows: 31,921 people within 1 mile; 95,763 people between 1 and 2 miles, and 106,888 people between 2 and 3 miles. The total population for the study area is approximately 234,572. These figures are based on a count of homes in the area multiplied by 3.8 persons, combined with census data for Alexandria, Virginia and Washington, D.C and its suburbs.<sup>1,37,38</sup>

### 3.7 Critical Environments

Except for occasional transient individuals, no federally listed or proposed endangered or threatened species are known to exist in the project impact area.<sup>39</sup>

A riverine tidal wetland, approximately 100 acres in size, is located about 3 stream miles downstream on the Potomac River.<sup>30</sup>

## SECTION 4

#### 4.0 WASTE TYPES AND QUANTITIES

Wastes disposed on site included storm sewer cleanings, street sweepings, road construction debris including milled asphalt, and incinerator ash residue. The incinerator ash comprised approximately 60 percent of the total fill material, according to Mr. Smith. All wastes were disposed under United States Government License No. 1-83.3,7,8

In March and November 1985, CRL performed comprehensive sampling at the subject site. Incinerator ash residue from the District of Columbia SWRC was found to contain some trace levels of chlorinated dioxins and furans. Other solid and aqueous samples obtained on site revealed elevated levels of heavy metals (lead up to 7,900 ppm) and trace levels of phenol (up to 110 ug/l and 790 ug/kg). Low to high levels of PAHs and up to 340 ppb of PCB 1260 were also revealed in on-site pond samples.<sup>10,11,12,13,15,16</sup>

Further EPA sampling in December 1988 revealed that the ash samples and the furnace residue were EP toxic for lead (up to 23 ppm) and cadmium (up to 8.45 ppm).<sup>17</sup>

Approximately 460,000 tons of fly ash residue were deposited on the St. Elizabeth's Hospital property from January 1982 until October 1989. The amount of ash residue shipped from SWRC to the landfill was recorded on "Daily Log Sheets of Ash Residue Out," according to Mr. Smith. A breakdown of ash residue deposited on site each year is as follows:<sup>3</sup>

1982:	74,667 tons
1983:	73,834 tons
1984:	62,683 tons
1985:	44,998 tons
1986:	66,007 tons
1987:	65,527 tons
1988:	37,564 tons
1989:	35,673 tons

If ash residue comprised 60 percent of the total fill material, this would indicate that about 767,000 tons of total waste materials were deposited on site.<sup>3,7</sup>

FIT 3 sampling in June 1990 revealed 53 ug/kg 4,4'-DDT, up to 2,000 mg/kg lead, up to 1.20 mg/kg mercury, up to 93 ug/kg tetrachloroethene, and up to 70 ug/kg toluene in on-site soil samples. Elevated levels of chromium (271 ug/l), cobalt (797 ug/l), mercury (0.80 ug/l), and lead (1,360 ug/l) were detected in downstream surface water samples.<sup>4</sup>

## SECTION 5

## 5.0 FIELD TRIP REPORT

### 5.1 Summary

On Wednesday, June 27, 1990, NUS FIT 3 members Linda Ciarletta, Janis Hottinger, Theresa Taggart, Kim Walters, Thomas Ferrie, and Eric Roland performed a site inspection of the St. Elizabeth's Hospital site in Washington, D.C. FIT 3 was accompanied by Richard Smith, of the District of Columbia Department of Public Works. Access to the site and permission to take photographs were granted by Mr. Smith. Weather conditions were sunny, with temperatures in the upper 80s. Photographs were taken on site (see figure 5.2, page 5-7, and the photograph log, section 5.5).

The total number of samples obtained was 5 aqueous and 10 solids, including blanks and duplicates (see figure 5.1, page 5-3).

### 5.2 Persons Contacted

#### 5.2.1 Prior to Field Trip

James McCreary  
Site Investigation Officer  
U.S. EPA  
841 Chestnut Building  
Ninth and Chestnut Streets  
Philadelphia, PA 19107  
(215) 597-1105

Richard Smith  
Chief  
Solid Waste Disposal Division  
Department of Public Works  
Second North Place, Southeast  
Washington, DC 20003  
(202) 727-4821

Jay Jahangri  
Department of Consumer Regulatory Affairs  
614 H Street, Northwest  
Room 519  
Washington, DC 20001  
(202) 783-3192

#### 5.2.2 At the Site

Richard Smith  
Chief  
Solid Waste Disposal Division  
Department of Public Works  
Second North Place, Southeast  
Washington, DC 20003  
(202) 727-4821

Earl Delauder  
I-95 Energy Resource Recovery Facility  
County of Fairfax  
9850 Lorton Road  
Lorton, VA 22079  
(703) 690-1703

### 5.2.3 Water Supply Well Information

The majority of residents within a three-mile radius of the subject site utilize public supplies as a source of potable water. No home wells were identified within 0.5 mile of the site.

DRAFT

TOD NUMBER F3-9606-31  
EPA NUMBER TP 14

### 5.3 SAMPLE LOG

SITE NAME 51 1/2 mi NW of St. Paul

TRAFFIC REPORTS			SAMPLE IDENTIFIER	PHASE	SAMPLE DESCRIPTION	SAMPLE LOCATION	TARGET USE	pH	FIELD MEASUREMENTS
Organic	Inorganic	High Hazard							
CEN76	MCDX39		S-1	SOL	Surface soil Sandy loam light brown, no odor	In northern end of on site rebar About 2.5 ft up gradient from property fence line	Off site fence line area		
CEN77	MCDX34		S-2	SOL	Surface soil dark brown lots of debris in soil	In on site drag drainage ditch Water table was about 0.5 m S 10° W of sample location	on site fence line area		
CEN78	MCDX31		S-3	SOL	Compacted surface soil medium brown clay rocky and sandy	Four locations from 5' to 40' from lake edge on western side of access road	Off site open area		
CEN80	MCDX33		S-5	SOL	Subsurface soil - 20" Dark brown w/clay only smell	Eastern end of open pile is about 25' N 70° W of sample location	On site fence line area		
CEN81	MCDX34		S-6	SOL	Duplicate of S-5	same location as S-5	on site fence line area		
CEN82	MCDT85		S-7	SOL	Subsurface soil 18" Dark brown rocky sandy	Water table is about 0.5 m S 30° E of sample location	on site fence line area		
CEN83	MCDT86		S-8	SOL	Subsurface soil 18" Dark brown rocky sandy	Highly nodding with alluvium on top is about 1 m S 32° W of sample location	on site fence line area		
CEN84	MCDT87		S Back	SOL	Surface soil Brown silty, some clay	Telephone pole is 3 ft N 88° W from sample location	On site fence line area		
CEN85	---		Top Blk	AG	Aquatic blank degraded with solid samples	top of block	top of block		

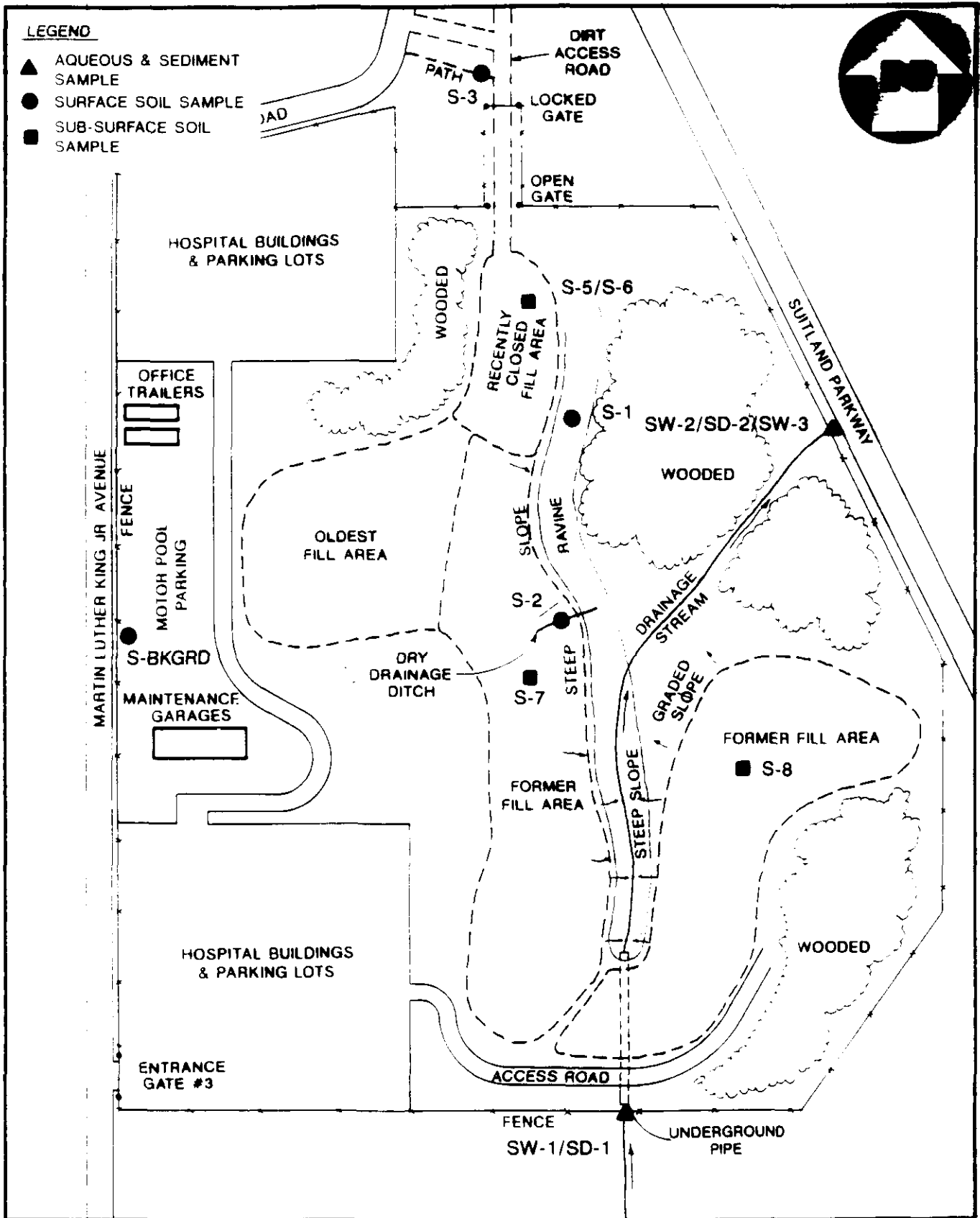
TDD NUMBER

EPA NUMBER

### 5.3

SITE NAME

[illegible]



**SAMPLE LOCATION MAP**  
**ST. ELIZABETHS HOSPITAL SITE, WASHINGTON, D.C.**  
 ( NO SCALE )

FIGURE 5.1

- A blue drum was observed in the ravine near the location of sample S-1. The drum was lying on its side and was partially crushed.
- A dry drainage ditch was observed on the eastern slope (40 percent slope) of the westernmost former fill area. The ditch contained a large amount of glass, metal, rubber, and other types of debris.
- The surface material at sample locations S-5/S-6, S-7, and S-8 was grayish in color, with a large amount of asphalt material and small rocks.
- Soil color changed at a depth of 12 inches at sample locations S-5/S-6 and S-7 and at a depth of 6 inches at sample location S-8.
- The drainage ditch and stream at sample location Sw2/Sd-2 were observed to contain metal waste, plastic bags, and other debris. A plastic bag with unidentifiable contents may have been medical in origin.

DRAFT

#### 5.4 Site Observations

- The HNU was set on the 0 to 20 scale. The background reading was 0.2 ppm. No readings above background were recorded.
- The mini-alert was set on the X1 position; no readings above background were recorded.
- The landfill area was completely enclosed with a six-foot fence.
- Two gates were located along the northern dirt access road into the fill area; the southernmost gate was open and was within the fenced area of the site, and the northernmost gate was locked.
- Concrete abutments blocked vehicular traffic from the access road outside the locked gate.
- A well worn path was located outside the locked gate. The path went from the access road to Dunbar Road. Trash and beer bottles were scattered in the area between the path and the locked gate.
- Scattered areas of sparse vegetation were located at various points throughout three sections of the landfill. The oldest fill area was unvegetated and was covered with compressed milled asphalt.
- Parts of the oldest fill area are currently used as parking lots for hospital vehicles.
- The recently closed fill area was covered with a mixture of milled asphalt from road construction activities and compost from a sewage treatment plant.
- A steep-sided ravine was located between the eastern and western fill areas.
- A drainage stream flowed into the landfill from the south, through piping under the access road, and between the two southern fill areas in the steep-sided ravine. The stream exited from the northeastern side of the site and flowed approximately 100 feet into a culvert under Suitland Parkway.



EPA REGION III  
SUPERFUND DOCUMENT MANAGEMENT SYSTEM

DOC ID # 413455  
PAGE #           

IMAGERY COVER SHEET  
UNSCANNABLE ITEM

Contact the CERCLA Records Center to view this document.

SITE NAME	<u>St. Elizabeth's Hospital</u>
OPERABLE UNIT	<u>00</u>
SECTION/BOX/FOLDER	<u>1C Box 2 PFE 1</u>

REPORT OR DOCUMENT TITLE	<u>Draft Site Inspection</u> <u>Report</u>
DATE OF DOCUMENT	<u>Feb. 27, 1991</u>
DESCRIPTION OF IMAGERY	<u>Photograph Log</u>
NUMBER AND TYPE OF IMAGERY ITEM(S)	<u>15 site photos</u>

**EPA**

**POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 1 - SITE LOCATION AND INSPECTION INFORMATION**

F3-9005-31

**I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. SITE NAME AND LOCATION**

01 SITE NAME (Legal, common, or descriptive name of site)

St. Elizabeth's Hospital

02 STREET, ROUTE NO., OR SPECIFIC LOCATION IDENTIFIER

2700 Martin Luther King Avenue

03 CITY

Washington

04 STATE

DC

05 ZIP CODE

20032

06 COUNTY

N/A

07 COUNTY CODE

0011

08 CONG DIST

DC01

09 COORDINATES

LATITUDE

38° 51' 05" N

LONGITUDE

76° 59' 35" W

10 TYPE OF OWNERSHIP (Check one)

☐ A PRIVATE☐ B FEDERAL☒ C STATE☐ D COUNTY☐ E MUNICIPAL☐ F OTHER☐ G UNKNOWN**III. INSPECTION INFORMATION**

01 DATE OF INSPECTION

06 / 27 / 90  
month day year

02 SITE STATUS

☐ A ACTIVE  
☒ B INACTIVE

03 YEARS OF OPERATION

October 1982 / October 1989  
BEGINNING YEAR ENDING YEAR

UNKNOWN

04 AGENCY PERFORMING INSPECTION (Check all that apply)

☐ A EPA☒ B EPA CONTRACTORNUS FIT 3  
(Name of firm)☐ C MUNICIPAL☐ D MUNICIPAL CONTRACTOR

(Name of firm)

☐ E STATE☐ F STATE CONTRACTOR

(Name of firm)

☐ G OTHER

(Specify)

05 CHIEF INSPECTOR

Linda Ciarletta

06 TITLE

Biologist

07 ORGANIZATION

NUS FIT 3

08 TELEPHONE NO.

(215) 687-9510

09 OTHER INSPECTORS

Janis Hottinger

10 TITLE

Environmental Scientist

11 ORGANIZATION

NUS FIT 3

12 TELEPHONE NO.

(215) 687-9510

Theresa Taggart

Environmental Scientist

NUS FIT 3

(215) 687-9510

Thomas Ferrie

Environmental Scientist

NUS FIT 3

(215) 687-9510

Eric Roland

Environmental Scientist

NUS FIT 3

(215) 687-9510

Kim Walters

Environmental Scientist

NUS FIT 3

(215) 687-9510

13 SITE REPRESENTATIVES INTERVIEWED

Richard Smith

14 TITLE

Chief Solid Waste  
Disposal Division,Department of Public  
Works

15 ADDRESS

Second North Place, Southeast  
Washington, D.C. 20003

16 TELEPHONE NO.

(202) 727-4821

Earl Delauder

Landfill Manager

9850 Lorton Road  
Lorton, VA 22079

(703) 690-1703

17 ACCESS GAINED BY  
(Check one)☒ PERMISSION  
☐ WARRANT

18 TIME OF INSPECTION

7:00 A.M.

19 WEATHER CONDITIONS

Sunny, with temperatures in the upper 80s.

**IV. INFORMATION AVAILABLE FROM**

01 CONTACT

James McCreary

02 OF (Agency/Organization)

U.S. EPA

03 TELEPHONE NO.

(215) 597-1175

04 PERSON RESPONSIBLE FOR SITE INSPECTION FORM

Linda Ciarletta

05 AGENCY

NUS

06 ORGANIZATION

FIT 3

07 TELEPHONE NO.

(215) 687-9510

08 DATE

08 20 90

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 2 - WASTE INFORMATION****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. WASTE STATES, QUANTITIES, AND CHARACTERISTICS****01 PHYSICAL STATES (Check all that apply)**

- ☐ A SOLID ☐ E SLURRY  
☐ B POWDER, FINES ☐ F LIQUID  
☐ C SLUDGE ☐ G GAS  
☒ D OTHER fly ash  
(Specify)

**02 WASTE QUANTITY AT SITE**

(Measures of waste quantities must be independent)

approximately  
460,000  
TONS  
CUBIC YARDS  
NO. OF DRUMS

**03 WASTE CHARACTERISTICS (Check all that apply)**

- ☒ A TOXIC ☐ E SOLUBLE ☐ I HIGHLY VOLATILE  
☐ B CORROSIVE ☐ F INFECTIOUS ☐ J EXPLOSIVE  
☐ C RADIOACTIVE ☐ G FLAMMABLE ☐ K REACTIVE  
☒ D PERSISTENT ☐ H IGNITABLE ☐ L INCOMPATIBLE  
☐ M NOT APPLICABLE

**III. WASTE TYPE**

CATEGORY	SUBSTANCE NAME	01 GROSS AMOUNT	02 UNIT OF MEASURE	03 COMMENTS
SLU	SLUDGE			
OLW	OILY WASTES			
SOL	SOLVENTS			
PSD	PESTICIDES			
OCC	OTHER ORGANIC CHEMICALS	unknown	unknown	
INC	INORGANIC CHEMICALS			fly ash samples were found to contain
ACD	ACIDS			elevated levels of several organic
BAS	BASES			chemicals and heavy metals.
MES	HEAVY METALS	unknown	unknown	

**IV. HAZARDOUS SUBSTANCES (See Appendix for most frequently cited CAS Numbers)**

01 CATEGORY	02 SUBSTANCE NAME	03 CAS NUMBER	04 STORAGE/ DISPOSAL METHOD	05 CONCENTRATION	06 MEASURE OF CONCENTRATION
	Previous Sampling:				
MES	lead	7439-92-1	fly ash and road	8020	ug/l
MES	cadmium	7440-43-9	construction debris were	123	ug/l
OCC	phenol	108-95-2	deposited directly on the	290	ug/kg
OCC	Aroclor 1260	11096-82-5	site	340	ug/kg
	FIT 3 Sampling:				
PSD	DDT	50-29-3		53	ug/kg
SOL	toluene	108-88-3		70	ug/kg
MES	chromium	7440-47-3		75.20	mg/kg
MES	cobalt	7440-48-4		797	ug/l
MES	lead	7439-92-1		2000	mg/kg
MES	mercury	7439-97-6		1.20	mg/kg

**IV. FEEDSTOCKS (See Appendix for CAS Numbers) N/A**

CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER	CATEGORY	01 FEEDSTOCK NAME	02 CAS NUMBER
FDS			FDS		
FDS			FDS		
FDS			FDS		
FDS			FDS		

**VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)**

US EPA. Inorganic and organic data Quality Assurance review, Case 5256/2057C, Saint Elizabeth's Hospital. March 6, 1986.  
NUS FIT 3. Preliminary assessment; site visit. TDD No. F3-8904-20, July 20, 1989.  
NUS FIT 3. Site inspection; sample results. TDD No. F3-9005-31, June 27, 1990.

**EPA**

**POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS**

**I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. HAZARDOUS CONDITIONS AND INCIDENTS**

01 ☒ A GROUNDWATER CONTAMINATION 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED 3348/3 mile radius 04 NARRATIVE DESCRIPTION

Elevated levels of heavy metals have been located in wastes at the site. The closest groundwater well to the site is 2.25 miles east-southeast of the site.

01 ☒ B SURFACE WATER CONTAMINATION 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED 0 04 NARRATIVE DESCRIPTION

An on-site drainage stream flows into a storm sewer system. The point of discharge of the sewer is unknown; the Anacostia and Potomac Rivers flow within 1 mile of the site. Elevated levels of chromium(271 ug/l), cobalt(797 ug/l), mercury(0.80 ug/l), and lead(1360 ug/l) were detected in downstream surface water samples.

01 ☐ C CONTAMINATION OF AIR 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED \_\_\_\_\_ 04 NARRATIVE DESCRIPTION

None reported or observed.

01 ☐ D FIRE/EXPLOSIVE CONDITIONS 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED \_\_\_\_\_ 04 NARRATIVE DESCRIPTION

None reported or observed.

01 ☒ E DIRECT CONTACT 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED 31921/1 mile radius 04 NARRATIVE DESCRIPTION

Although the site is entirely fenced, it has been noted in the past that the entrance gates are frequently unrestricted. Residential communities are located adjacent to the northern edge of the site.

01 ☒ F CONTAMINATION OF SOIL 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
03 AREA POTENTIALLY AFFECTED 20 acres 04 NARRATIVE DESCRIPTION

Elevated levels of heavy metals have been identified in wastes deposited on site. No liner was utilized in the landfill. Soil samples on site revealed 53 ug/kg of 4,4-DDT, up to 2000 mg/kg of lead, up to 1.20 mg/kg of mercury, up to 93 ug/kg of PCE, and up to 70 ug/kg of toluene.

01 ☒ G DRINKING WATER CONTAMINATION 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☒ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED 3348/3 mile radius 04 NARRATIVE DESCRIPTION

There are no surface water intakes within 3 stream miles downstream. There is a population of 3,348 people within a 3-mile radius that depend on groundwater for its potable water supply.

01 ☐ H WORKER EXPOSURE/INJURY 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
03 WORKERS POTENTIALLY AFFECTED \_\_\_\_\_ 04 NARRATIVE DESCRIPTION

None reported or observed.

01 ☒ I POPULATION EXPOSURE/INJURY 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED  
03 POPULATION POTENTIALLY AFFECTED 31921/1 mile 04 NARRATIVE DESCRIPTION

Although the site is entirely fenced, it has been noted in the past that the entrance gates are frequently unrestricted. Residential communities are located adjacent to the northern edge of the site.

**EPA**

**POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 3 - DESCRIPTION OF HAZARDOUS CONDITIONS AND INCIDENTS**

**I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. HAZARDOUS CONDITIONS AND INCIDENTS (Continued)**01 ☒ DAMAGE TO FLORA 02 ☒ OBSERVED (DATE 6/27/90) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION

Scattered areas of sparse vegetation were noted at various points throughout the landfill.  
Most of the landfill was well vegetated.

01 ☐ DAMAGE TO FAUNA 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION (Include name(s) of species)

None reported or observed.

01 ☐ CONTAMINATION OF FOOD CHAIN 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION

None reported or observed.

01 ☒ UNSTABLE CONTAINMENT OF WASTES 02 ☒ OBSERVED (DATE 6/27/90) ☐ POTENTIAL ☐ ALLEGED

(Spills, Runoff, Standing liquids, Leaking drums)

03 POPULATION POTENTIALLY AFFECTED 234,572/3 mile radius 04 NARRATIVE DESCRIPTION

Wastes deposited on site are in direct contact with soils. No liner was utilized. Soil samples on site revealed 53 ug/kg of 4,4-DDT, up to 93 ug/kg of PCE, up to 2000 mg/kg of lead, up to 1.20 mg/kg of mercury, and up to 70 ug/kg of toluene.

01 ☐ DAMAGE TO OFFSITE PROPERTY 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION

None reported or observed.

01 ☒ CONTAMINATION OF SEWERS, STORM DRAINS, WWTPS 02 ☒ OBSERVED (DATE 6/27/90) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION

Surface water runoff from the site flows into a storm sewer adjacent to the site. Elevated levels of chromium(271 ug/l), cobalt(797 ug/l), mercury(0.80 ug/l), and lead(1360 ug/l) were detected in surface water downstream from the site.

01 ☐ ILLEGAL/UNAUTHORIZED DUMPING 02 ☐ OBSERVED (DATE \_\_\_\_\_) ☐ POTENTIAL ☐ ALLEGED

## 04 NARRATIVE DESCRIPTION

None reported or observed.

## 05 DESCRIPTION OF ANY OTHER KNOWN, POTENTIAL, OR ALLEGED HAZARDS

None reported or observed.

**III. TOTAL POPULATION POTENTIALLY AFFECTED: 234,572 within 3 miles****IV. COMMENTS**

N/A

**V. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)**

US EPA. Summary Report, Dioxin Sampling at St. Elizabeth's Hospital. March 6 through 8, 1985.  
Smith, Richard, Chief Solid Waste Disposal Division, Government of District of Columbia, with Richard Sheldon,  
NUS FIT 3. Meeting. July 20, 1989.  
NUS FIT 3. Site inspection; site visit. TOD No. F3-9005-31, June 27, 1989.  
NUS FIT 3. Site inspection; sample results. June 27, 1989.

**EPA**

**POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 4 - PERMIT AND DESCRIPTIVE INFORMATION**

**I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. PERMIT INFORMATION**

01 TYPE OF PERMIT ISSUED (Check all that apply)	02 PERMIT NUMBER	03 DATE ISSUED	04 EXPIRATION DATE	05 COMMENTS
<input type="checkbox"/> A NPDES				
<input type="checkbox"/> B LIC				
<input type="checkbox"/> C AIR				
<input type="checkbox"/> D RCRA				
<input type="checkbox"/> E RCRA INTERIM STATUS				
<input type="checkbox"/> F SPCC PLAN				
<input type="checkbox"/> G STATE (specify)				
<input type="checkbox"/> H LOCAL (specify)				
<input type="checkbox"/> I OTHER (specify) Federal Govt.	1-83	10-82		The landfill was completely closed in October 1989.
<input type="checkbox"/> J NONE Department of HEW				

**III. SITE DESCRIPTION**

01 STORAGE/DISPOSAL (Check all that apply)	02 AMOUNT	03 UNIT OF MEASURE	04 TREATMENT (Check all that apply)	05 OTHER
<input checked="" type="checkbox"/> A. SURFACE IMPOUNDMENT	20	acres	<input checked="" type="checkbox"/> A. INCINERATION before disposal in landfill	<input checked="" type="checkbox"/> A. BUILDINGS ON SITE
<input type="checkbox"/> B. PILES			<input type="checkbox"/> B. UNDERGROUND INJECTION	
<input type="checkbox"/> C. DRUMS, ABOVE GROUND			<input type="checkbox"/> C. CHEMICAL/PHYSICAL	
<input type="checkbox"/> D. TANK, ABOVE GROUND			<input type="checkbox"/> D. BIOLOGICAL	
<input type="checkbox"/> E. TANK, BELOW GROUND			<input type="checkbox"/> E. WASTE OIL PROCESSING	
<input type="checkbox"/> F. LANDFILL			<input type="checkbox"/> F. SOLVENT RECOVERY	
<input type="checkbox"/> G. LANDFARM			<input type="checkbox"/> G. OTHER RECYCLING/RECOVERY	
<input type="checkbox"/> H. OPEN DUMP			<input type="checkbox"/> H. OTHER (Specify)	
<input type="checkbox"/> I. OTHER (Specify)				06 AREA OF SITE 20 (Acres)

**07 COMMENTS**

The landfill on the hospital property was used by the District of Columbia from 1982 to 1987, for the disposal of road construction debris, street sweepings, and incinerator fly ash from D.C.'s Solid Waste Reduction Center's electrostatic precipitators.

**IV. CONTAINMENT**

01 CONTAINMENT OF WASTES (Check one)

☐ A. ADEQUATE, SECURE      ☐ B. MODERATE      ☒ C. INADEQUATE, POOR      ☐ D. INSECURE, UNSOUND, DANGEROUS

02 DESCRIPTION OF DRUMS, DIKING, LINERS, BARRIERS, ETC.

The landfill was unlined. Surface water runoff from the site runoff site into a storm sewer.

**V. ACCESSIBILITY**

01 WASTE EASILY ACCESSIBLE      ☐ YES      ☒ NO

02 COMMENTS

The site is entirely fenced. However, it has been noted in the past that the entrance gates are frequently unrestricted.

**VI. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

US EPA. Summary Report, Dioxin Sampling at St. Elizabeth's Hospital. March 6 through 8, 1985.  
Smith, Richard, Chief Solid Waste Disposal Division, Government of District of Columbia, with Richard Sheldon,  
NUS FIT 3. Meeting. July 20, 1989.  
NUS FIT 3. Site inspection; site visit. TDD No. F3-9005-31, July 27, 1989.



POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE  
DC

02 SITE NUMBER  
14

II. DRINKING WATER SUPPLY

01 TYPE OF DRINKING SUPPLY  
(Check as applicable)

SURFACE WELL  
COMMUNITY A ☒ B ☒  
NON-COMMUNITY C ☐ D ☒

02 STATUS

ENDANGERED AFFECTED MONITORED  
A ☒ B ☐ C ☐  
D ☒ E ☐ F ☐

03 DISTANCE TO SITE

A surface 10.5 (mi) upstream  
B well 2.25 (mi)

III. GROUNDWATER

01 GROUNDWATER USE IN VICINITY (Check one)

☒ A ONLY SOURCE FOR DRINKING ☐ B DRINKING (Other sources available)  
☐ C COMMERCIAL, INDUSTRIAL, IRRIGATION (Limited other sources available) ☐ D NOT USED, UNUSABLE  
☐ COMMERCIAL, INDUSTRIAL, IRRIGATION (No other water sources available)

02 POPULATION SERVED BY GROUND WATER

3,348 within 3 miles

03 DISTANCE TO NEAREST DRINKING WATER WELL

2.25 (mi)

04 DEPTH TO GROUNDWATER

100 - 150 (ft)

05 DIRECTION OF GROUNDWATER FLOW

northeast

06 DEPTH TO AQUIFER  
OF CONCERN

100 - 150 (ft)

07 POTENTIAL YIELD  
OF AQUIFER

72,000 (gpd)

08 SOLE SOURCE AQUIFER

☐ YES ☒ NO

09 DESCRIPTION OF WELLS (Including usage, depth, and location relative to population and buildings)

A development well is located 2.25 miles east-southeast of the site. It is developed in the Potomac Group, has a total depth of 620 feet and a water level of 255 feet, and yields 50 gpm. Two nearby domestic wells are located 2.5 miles south and 2.5 miles south-southeast of the site and are developed in the Potomac Group. The 2 wells have a total depths of 330 feet and 327 feet and water levels of 190 feet and 200 feet, respectively, and yield 10 gpm each.

10 RECHARGE AREA

☒ YES  
☐ NO

COMMENTS

Land surface acts as recharge area for infiltration of local precipitation.

11 DISCHARGE AREA

☒ YES  
☐ NO

COMMENTS

Wetlands present in study area. Anacostia River and Potomac River are located near the site.

IV. SURFACE WATER

01 SURFACE WATER USE IN VICINITY (Check one)

☒ A RESERVOIR, RECREATION DRINKING WATER SOURCE ☐ B IRRIGATION, ECONOMICALLY IMPORTANT RESOURCES ☐ C COMMERCIAL, INDUSTRIAL ☐ D NOT CURRENTLY USED

02 AFFECTED/POTENTIALLY AFFECTED BODIES OF WATER

NAME

AFFECTED

DISTANCE TO SITE

Anacostia River

☐

1

(mi)

Potomac River

☐

1

(mi)

V. DEMOGRAPHIC AND PROPERTY INFORMATION

01 TOTAL POPULATION WITHIN

ONE (1) MILE OF SITE

TWO (2) MILES OF SITE

THREE (3) MILES OF SITE

A 31,921  
NO. OF PERSONS

B 127,684  
NO. OF PERSONS

C 234,572  
NO. OF PERSONS

02 DISTANCE TO NEAREST POPULATION

< 0.1 (mi)

03 NUMBER OF BUILDINGS WITHIN TWO (2) MILES OF SITE

33,601

04 DISTANCE TO NEAREST OFF-SITE BUILDING

< 0.1 (mi)

05 POPULATION WITHIN VICINITY OF SITE (Provide narrative description of nature of population within vicinity of site, e.g., rural, village, densely populated urban area)

Land use in the area is primarily residential.



POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 5 - WATER, DEMOGRAPHIC, AND ENVIRONMENTAL DATA

I. IDENTIFICATION

01 STATE  
DC

02 SITE NUMBER  
14

VI. ENVIRONMENTAL INFORMATION

01 PERMEABILITY OF UNSATURATED ZONE (Check one)

☐ A  $10^{-6}$  -  $10^{-8}$  cm/sec ☐ B  $10^{-4}$  -  $10^{-6}$  cm/sec ☒ C  $10^{-5}$  -  $10^{-3}$  cm/sec ☐ D GREATER THAN  $10^{-3}$  cm/sec

02 PERMEABILITY OF BEDROCK (Check one)

☐ A IMPERMEABLE  
(Less than  $10^{-6}$  cm/sec) ☐ B RELATIVELY IMPERMEABLE  
( $10^{-4}$  -  $10^{-6}$  cm/sec) ☒ C  $10^{-5}$  to  $10^{-3}$   
( $10^{-2}$  -  $10^{-4}$  cm/sec) ☐ D VERY PERMEABLE  
(greater than  $10^{-2}$  cm/sec)

03 DEPTH TO BEDROCK

unknown (ft)

04 DEPTH OF CONTAMINATED SOIL ZONE

unknown (ft)

05 SOIL pH

unknown

06 NET PRECIPITATION

6.73 (in)

07 ONE-YEAR 24-HOUR RAINFALL

2.7 (in)

08 SLOPE

SITE SLOPE  
average  
20 %

DIRECTION OF SITE SLOPE

northeast

TERRAIN AVERAGE SLOPE

40 %

09 FLOOD POTENTIAL

N/A

SITE IS IN YEAR FLOOD PLAIN

10 N/A

☐ SITE IS ON BARRIER ISLAND, COASTAL HIGH HAZARD AREA, RIVERINE FLOODWAY

11 DISTANCE TO WETLANDS (5-acre minimum)

ESTUARINE

OTHER

A N/A (mi) B 3 (mi)

12 DISTANCE TO CRITICAL HABITAT (of endangered species)

> 3 (mi)

ENDANGERED SPECIES

13 LAND USE IN VICINITY

DISTANCE TO:

COMMERCIAL/INDUSTRIAL

RESIDENTIAL AREAS, NATIONAL/STATE PARKS,  
FORESTS, OR WILDLIFE RESERVES

AGRICULTURAL LANDS  
PRIME AG LAND

AG LAND

A < 0.1 (mi) B < 0.1 (mi) C (mi) D (mi)

14 DESCRIPTION OF SITE IN RELATION TO SURROUNDING TOPOGRAPHY

The site generally slopes northeastwardly toward an on-site ravine that is located in the center of the landfill and runs in a north-south direction.

VII. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)

Tompkins, M.D. Prince George's County Groundwater Information: Well Records, Chemical-Quality Data, Pumpage, Appropriation Data, Observation Well Records and Well Logs. Maryland Water Resources Basic Data Report Number 13, 1983.

Vokes, H.E., and J. Edwards, Jr., Maryland Geological Survey, Geography and Geology of Maryland Bulletin 19, 1974.

NUS FIT 3. Site inspection; site visit. TDD No. F3-9005-31, June 27, 1990.

USGS Topographic Maps. Anacostia, D.C., MD, Washington West, D.C., MD, and VA, Washington East, D.C., MD, and VA, and Alexandria, D.C., MD, and VA.

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 6 - SAMPLE AND FIELD INFORMATION****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. SAMPLES TAKEN**

SAMPLE TYPE	01 NUMBER OF SAMPLES TAKEN	02 SAMPLES SENT TO	03 ESTIMATED DATE RESULTS AVAILABLE
GROUNDWATER			
SURFACE WATER	3	Organic were sent to Clayton Environmental	currently
WASTE		Inorganic were sent to Rocky Mountain Analysis	
AIR			
RUNOFF			
SPILL			
SOIL	10	Organic were sent to Clayton Environmental	currently
VEGETATION		Inorganic were sent to Rocky Mountain Analysis	
OTHER			

**III. FIELD MEASUREMENTS TAKEN**

01 TYPE	02 COMMENTS
HNU	A background reading of 0.2 ppm was recorded; no readings above background were recorded.
radiation mini-alert	No readings above background were recorded.

**IV. PHOTOGRAPHS AND MAPS**

01 TYPE	<input checked="" type="checkbox"/> GROUND <input type="checkbox"/> AERIAL	02 IN CUSTODY OF <u>NUS FIT 3 Wayne, Pennsylvania</u> <small>(Name of organization or individual)</small>
03 MAPS	04 LOCATION OF MAPS	
<input checked="" type="checkbox"/> YES		
<input type="checkbox"/> NO	<u>NUS FIT 3 Wayne, Pennsylvania</u>	

**V. OTHER FIELD DATA COLLECTED (Provide narrative description)**

N/A

**VI. SOURCES OF INFORMATION (Cite specific references, e.g., state files, sample analysis, reports)**

NUS FIT 3. Site inspection; site visit. TDD No. F3-9005-31, June 27, 1990.

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 7 - OWNER INFORMATION****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. CURRENT OWNER(S)****PARENT COMPANY** (if applicable)

01 NAME

02 D &amp; B NUMBER

Government of the District of Columbia, Municipal Center

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

1301 E Street Northwest

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

Washington

06 STATE

DC

07 ZIP CODE

20032

14 CITY

15 STATE

16 ZIP CODE

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

**III. PREVIOUS OWNERS(S)** (List most recent first)**IV. REALTY OWNER(S)** (if applicable, list most recent first)

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

01 NAME

N/A

02 D &amp; B NUMBER

10 NAME

N/A

11 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

12 STREET ADDRESS (P.O. Box, RFD #, Etc.)

13 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

14 CITY

15 STATE

16 ZIP CODE

**IV. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

NUS Corporation. Preliminary assessment report. TDD No. F3-8904-20, December 29, 1989.

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART B - OPERATOR INFORMATION****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. CURRENT OPERATOR** (Provide if different from owner)**OPERATOR'S PARENT COMPANY** (if applicable)

01 NAME N/A			02 D & B NUMBER			10 NAME N/A			11 D & B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, Etc.)				04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, Etc.)				13 SIC CODE			
05 CITY			06 STATE		07 ZIP CODE		14 CITY			15 STATE		16 ZIP CODE	
08 YEARS OF OPERATION		09 NAME OF OWNER											

**III. PREVIOUS OPERATOR (S)** (List most recent first, provide if different from owner)**PREVIOUS OPERATOR'S PARENT COMPANIES** (if applicable)

01 NAME Government of the District of Columbia, Municipal Center			02 D & B NUMBER			10 NAME N/A			11 D & B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, Etc.) 1301 E Street Northwest				04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, Etc.)				13 SIC CODE			
05 CITY Washington			06 STATE DC		07 ZIP CODE 20032		14 CITY			15 STATE		16 ZIP CODE	
08 YEARS OF OPERATION 1982 to 1989		09 NAME OF OWNER D.C. Government 1987 to 1989 U.S. Government 1982 to 1987											
01 NAME N/A			02 D & B NUMBER			10 NAME N/A			11 D & B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, Etc.)				04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, Etc.)				13 SIC CODE			
05 CITY			06 STATE		07 ZIP CODE		14 CITY			15 STATE		16 ZIP CODE	
08 YEARS OF OPERATION		09 NAME OF OWNER											
01 NAME N/A			02 D & B NUMBER			10 NAME N/A			11 D & B NUMBER				
03 STREET ADDRESS (P.O. Box, RFD #, Etc.)				04 SIC CODE		12 STREET ADDRESS (P.O. Box, RFD #, Etc.)				13 SIC CODE			
05 CITY			06 STATE		07 ZIP CODE		14 CITY			15 STATE		16 ZIP CODE	
08 YEARS OF OPERATION		09 NAME OF OWNER											

**IV. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

NUS Corporation. Preliminary assessment report. TDD No. F3-8904-20, December 29, 1989.

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 9 - GENERATOR/TRANSPORTER INFORMATION****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. ON-SITE GENERATOR**01 NAME  
N/A

02 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

**III. OFF-SITE GENERATOR(S)**01 NAME  
N/A

02 D &amp; B NUMBER

01 NAME  
N/A

02 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

05 CITY

06 STATE

07 ZIP CODE

01 NAME  
N/A

02 D &amp; B NUMBER

01 NAME  
N/A

02 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

05 CITY

06 STATE

07 ZIP CODE

**IV. TRANSPORTER(S)**01 NAME  
N/A

02 D &amp; B NUMBER

01 NAME  
N/A

02 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

05 CITY

06 STATE

07 ZIP CODE

01 NAME  
N/A

02 D &amp; B NUMBER

01 NAME  
N/A

02 D &amp; B NUMBER

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

03 STREET ADDRESS (P.O. Box, RFD #, Etc.)

04 SIC CODE

05 CITY

06 STATE

07 ZIP CODE

05 CITY

06 STATE

07 ZIP CODE

**V. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 10 - PAST RESPONSE ACTIVITIES****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. PAST RESPONSE ACTIVITIES**01 ☐ A WATER SUPPLY CLOSED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ B TEMPORARY WATER SUPPLY PROVIDED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ C PERMANENT WATER SUPPLY PROVIDED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ D SPILLED MATERIAL REMOVED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ E CONTAMINATED SOIL REMOVED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ F WASTE REPACKAGED 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ G WASTE DISPOSED ELSEWHERE 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ H ON-SITE BURIAL 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ I IN SITU CHEMICAL TREATMENT 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ J IN SITU BIOLOGICAL TREATMENT 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ K IN SITU PHYSICAL TREATMENT 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ L ENCAPSULATION 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ M EMERGENCY WASTE TREATMENT 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ N CUTOFF WALLS 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ O EMERGENCY DRAINING/SURFACE WATER DIVERSION 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ P CUTOFF TRENCHES/SUMP 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

01 ☐ Q SUBSURFACE CUTOFF WALL 02 DATE \_\_\_\_\_ 03 AGENCY \_\_\_\_\_  
04 DESCRIPTION

None reported.

**EPA****POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 10 - PAST RESPONSE ACTIVITIES****I. IDENTIFICATION**01 STATE  
DC02 SITE NUMBER  
14**II. PAST RESPONSE ACTIVITIES (Continued)**

01 <input type="checkbox"/> 3 BARRIER WALLS CONSTRUCTED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 4 CAPPING COVERING	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 5 BULK TANKAGE REPAIRED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 6 GROUT CURTAIN CONSTRUCTED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 7 BOTTOM SEALED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 8 GAS CONTROL	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input checked="" type="checkbox"/> 9 FIRE CONTROL	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 10 LEACHATE TREATMENT	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 11 AREA EVACUATED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 12 ACCESS TO SITE RESTRICTED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 13 POPULATION RELOCATED	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		
01 <input type="checkbox"/> 14 OTHER REMEDIAL ACTIVITIES	02 DATE _____	03 AGENCY _____
04 DESCRIPTION None reported.		

**III. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

NUS Corporation. Preliminary assessment report. TDD No. F3-8904-20, December 29, 1989.

**EPA**

**POTENTIAL HAZARDOUS WASTE SITE  
SITE INSPECTION REPORT  
PART 11 - ENFORCEMENT INFORMATION**

**I. IDENTIFICATION**

01 STATE

DC

02 SITE NUMBER

14

**II. ENFORCEMENT INFORMATION**21 PAST REGULATORY ACTION ☒ YES ☐ NO

22 DESCRIPTION OF FEDERAL STATE LOCAL REGULATORY ENFORCEMENT ACTION

In March 1985, at the request of EPA Region III, Waste Management Division, CRL performed sampling of the fill material deposited on St. Elizabeth's Hospital grounds by D.C. 2,3,7,8-TCDD was measured above the CDC's recommended limit of 1 ppb in soil for residential areas. Elevated levels of heavy metals and PCBs were also revealed in sediments and leachate.

No remedial action has been taken to date.

**III. SOURCES OF INFORMATION** (Cite specific references, e.g., state files, sample analysis, reports)

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SECTION 6

## 6.0 REFERENCES FOR SECTIONS 1.0 THROUGH 5.0

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5. Smith, Richard, Chief, Solid Waste Disposal Division, District of Columbia Department of Public Works, with Linda Ciarletta, NUS FIT 3. Meeting. June 27, 1990.
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SECTION 7

## 7.0 LABORATORY DATA

### 7.1 Sample Data Summary

The attached data summary contains only compounds which were identified as detected in at least one sample. The complete list of compounds analyzed for, their results, and the associated detection limits are located as an appendix. Results for tentatively identified compounds appear following the organic data section of this report.

The following codes are used in the data summary to indicate the confidence in the laboratory results:

#### CODES RELATING TO IDENTIFICATION

(confidence concerning presence or absence of compounds):

- U = Not detected. The associated number indicates approximate sample concentration necessary to be detected.
- (NO CODE) = Confirmed identification.
- B = Not detected substantially above the level reported in laboratory or field blanks.
- R = Unreliable result. Analyte may or may not be present in the sample. Supporting data necessary to confirm result.
- N = Tentative identification. Consider present. Special methods may be needed to confirm its presence or absence in future sampling efforts.

#### CODES RELATED TO QUANTITATION

(can be used for both positive results and sample quantitation limits):

- J = Analyte present. Reported value may not be accurate or precise.
- K = Analyte present. Reported value may be biased high. Actual value is expected to be lower.
- L = Analyte present. Reported value may be biased low. Actual value is expected to be higher.
- UJ = Not detected, quantitation limit may be inaccurate or imprecise.
- UL = Not detected, quantitation limit is probably higher.

#### OTHER CODES

- Q = No analytical result.

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F319005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(S): 06-27-90 STATE/COUNTY CODE: 0011  
 CASE NUMBER: 14399 EPA NUMBER: 0014

	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
	SAMPLE ID:	Sw-1	Sw-2	Sw-3	Aq blank	S-1	S-2
	LOCATION:	drain, strm upstream	drain, stream dwnstr, offst	duplicate of Sw-2	aqueous blank	on-site surf rest. access	onsite surf. rest. access
	PH:	6.0	5.6	5.6	5.7	7.0	7.5
	FIELD MEASUREMENTS:	225 umhos/cm	5220umhos/cm	5220umhos/cm	1 umho/cm	none >bkg	none >bkg
	PERCENT SOLIDS:					93.0%	85.0%
TYPE OF DATA:	VOLATILES						
	DILUTION FACTOR:	1.0	1.0	1.0	1.0	1.1	1.2

DET. LIMIT	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
CRQL (@=IDL)	UNITS:	ug/l	ug/l	ug/l	ug/l	ug/kg	ug/kg
5.00 methylene chloride		3.00 B				36.00 B	380.00R@
10.00 acetone							110.00B@
5.00 carbon disulfide						85.00 J	280.00J@
5.00 chloroform			0.80 J	0.90 J			
10.00 2-butanone							
5.00 trichloroethene							3.00 J
5.00 tetrachloroethene							52.00J@
5.00 toluene						19.00 J	70.00 J
5.00 ethylbenzene							3.00 J
5.00 styrene							12.00 B
5.00 total xylenes							17.00 J
TYPE OF DATA:	SEMIVOLATILES						
	DILUTION FACTOR:	0.0	0.0	0.0	1.0	71.0	78.0

DET. LIMIT	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
CRQL (@=IDL)	UNITS:	n/a	n/a	n/a	ug/l	ug/kg	ug/kg
10.00 4-methylphenol							
10.00 naphthalene							
10.00 2-methylnaphthalene							
10.00 acenaphthene							
10.00 dibenzofuran							
10.00 fluorene							
10.00 phenanthrene						230.00 J	250.00 J
10.00 anthracene							
10.00 di-n-butyl phthalate							
10.00 fluoranthene						370.00 J	370.00 J
10.00 pyrene						630.00 J	550.00 J
10.00 benzo(a)anthracene						220.00 J	270.00 J
10.00 bis(2-ethylhexyl) phthalate						580.00 B	760.00 B
10.00 chrysene						280.00 J	280.00 J
10.00 di-n-octyl phthalate							130.00 B
10.00 benzo(b)fluoranthene						280.00 J	310.00 J
10.00 benzo(k)fluoranthene						240.00 J	250.00 J
10.00 benzo(a)pyrene						290.00 J	250.00 J
10.00 indeno(1,2,3-cd)pyrene						130.00 J	160.00 J
10.00 dibenz(a,h)anthracene							
10.00 benzo(g,h,i)perylene						110.00 J	210.00 J
TYPE OF DATA:	PESTICIDES						
	DILUTION FACTOR:	0.0	0.0	0.0	1.0	340.0	380.0

DET. LIMIT	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
CRQL (@=IDL)	UNITS:	n/a	n/a	n/a	ug/l	ug/kg	ug/kg
Comments:							

@= result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3 9005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(S): 06-27-90  
 CASE NUMBER: 14399

STATE/COUNTY CODE: 0011  
 EPA NUMBER: DC14

	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
	SAMPLE ID:	Sw-1	Sw-2	Sw-3	Aq-blank	S-1	S-2
	LOCATION:	drain.strm upstream	drain.stream dwnstr,offst	duplicate of Sw-2	aqueous blank	on-site surf rest. access	onsite surf. rest. access
		rest. access	open access			sandy loam	dark brown
		clr,no odor	oily,foamy			ltbrw.no odr	alotofuebris
	PH:	6.0	5.6	5.6	3.7	7.0	7.5
	FIELD MEASUREMENTS:	225 umhos/cm	5220umhos/cm	5220umhos/cm	1 umho/cm	none bkg	none bkg
	PERCENT SOLIDS:					93.0%	85.0%
TYPE OF DATA:	PESTICIDES						
	DILUTION FACTOR:				1.0	340.0	380.0
DET. LIMIT	SAMPLE NUMBER:	CEN86	CEN87	CEN89	CEN90	CEN76	CEN77
CRQL (≡IDL)	UNITS:	n/a	n/a	n/a	ug/l	ug/kg	ug/kg
						53.00 R	
	0.10 4,4'-DDT						
	Comments:						
	≡ result reported from re-analysis						

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3-9005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(S): 06-27-90 STATE/COUNTY CODE: 0011  
 CASE NUMBER: 14399 EPA NUMBER: DC14

SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
SAMPLE ID:	S-3	Sd-1	S-5	S-6	S-7	S-8
LOCATION:	offsite surf composite	sediment same loc. Sw-1	ons, rest. acc 20" subsoil	Duplicate of S-5	ons, rest. acc 18" subsoil	ons, rest. acc 12" sub soil
	med brw rocky open access	light brown claylike	dk brw clay oily smell		dk brwn rocky, sandy	dk brwn rocky, sandy
PH:	6.5	5.7	7.1	7.0	7.3	7.4
FIELD MEASUREMENTS:	none > bkg	none > bkg	none > bkg	none > bkg	none > bkg	none > bkg
PERCENT SOLIDS:	90.0%	47.0%	84.0%	88.0%	87.0%	90.0%
TYPE OF DATA:	VOLATILES					
DILUTION FACTOR:	1.1	2.1	1.2	1.1	1.1	1.1

DET. LIMIT	SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
5.00 methylene chloride		48.00R@	5.00 B	3.00 B	6.00 B	13.00 B	15.00 B
10.00 acetone			22.00 B	18.00 B	32.00 B	53.00 B	130.00 B
5.00 carbon disulfide		12.00J@			6.00	37.00 J	27.00
5.00 chloroform							
10.00 2-butanone							20.00
5.00 trichloroethene							
5.00 tetrachloroethene							93.00
5.00 toluene		4.00J@				4.00 J	7.00
5.00 ethylbenzene							
5.00 styrene							
5.00 total xylenes							15.00
TYPE OF DATA:	SEMIVOLATILES						
DILUTION FACTOR:		73.0	86.0	79.0	75.0	76.0	2200.0

DET. LIMIT	SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg
10.00 4-methylphenol						510.00 J	
10.00 naphthalene						100.00 J	
10.00 2-methylnaphthalene						90.00 J	
10.00 acenaphthene						72.00 J	
10.00 dibenzofuran						280.00N@	
10.00 fluorene						450.00N@	
10.00 phenanthrene		460.00L@	780.00J@			830.00 J	
10.00 anthracene		87.00L@	170.00 J			120.00 J	
10.00 di-n-butyl phthalate		310.00 B					
10.00 fluoranthene		820.00L@	930.00J@			1300.00 J	
10.00 pyrene		1200.00 L	1400.00 @			1200.00	
10.00 benzo(a)anthracene		470.00L@	500.00J@			620.00 J	
10.00 bis(2-ethylhexyl) phthalate		460.00B@	1100.00 B	440.00B@		1900.00 B	12000.00 B
10.00 chrysene		580.00 L	450.00 J			550.00 J	
10.00 di-n-octyl phthalate							
10.00 benzo(b)fluoranthene		1000.00 L	1100.00 @			900.00	
10.00 benzo(k)fluoranthene		600.00L@	310.00 J			2900.00N@	
10.00 benzo(a)pyrene		510.00 L	460.00 J			370.00 J	
10.00 indeno(1,2,3-cd)pyrene		390.00L@	250.00 J			94.00 J	
10.00 dibenz(a,h)anthracene		100.00 L				110.00N@	
10.00 benzo(g,h,i)perylene		350.00 L	320.00J@			220.00 J	
TYPE OF DATA:	PESTICIDES						
DILUTION FACTOR:		360.0	420.0	380.0	360.0	370.0	360.0

DET. LIMIT	SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg

Comments: @= result reported from re analysis

SITE NAME: St. Elizabeth's Hospital  
 TOD NUMBER: F3 9005 31  
 LAB NAMES: Organic-Clayton Novt Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(S): 06-27-90  
 CASE NUMBER: 14399  
 STATE/COUNTY CODE: 0011  
 EPA NUMBER: DC14

	SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
	SAMPLE ID:	S-3	Sd-1	S-5	S-6	S-7	S-8
	LOCATION:	offsite surf composite	sediment same loc. Sw-1	ons, rest. acc 20" subsoil	Duplicate of S-5	ons, rest. acc 18" subsoil	ons, rest. acc 12" sub soil
		medbrw rocky open access	light brown claylike	drk. brw. clay oily smell		drk brwn rocky, sandy	drk brwn rocky, sandy
	PH:	6.5	5.7	7.1	7.0	7.3	7.4
	FIELD MEASUREMENTS:	none > bkg	none > bkg	none > bkg	none > bkg	none > bkg	none > bkg
	PERCENT SOLIDS:	90.0%	47.0%	84.0%	88.0%	87.0%	90.0%
TYPE OF DATA:	PESTICIDES						
	DILUTION FACTOR:	360.0	420.0	380.0	360.0	370.0	360.0
DET. LIMIT	SAMPLE NUMBER:	CEN78	CEN79	CEN80	CEN81	CEN82	CEN83
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg	ug/kg

0.10 4,4'-DDT

Comments:

@= result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3-9005-31  
 LAB NAMES: Organic/Layton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(s): 06-27-90 STATE/COUNTY CODE: 0011  
 CASE NUMBER: 14399 EPA NUMBER: DC14

	SAMPLE NUMBER:	CEN84	CEN88	CEN85
	SAMPLE ID:	S-back	Sd-2	tripbtk
	LOCATION:	backgrd. surface rest.access brw,silt,cl	sediment same locSw-2 openacc,offs red,sandy	Trip blank blank for solids
	PH:	6.3	6.2	
	FIELD MEASUREMENTS:	none>bkg	none > bkg	none>bkg
	PERCENT SOLIDS:	8.0%	44.0%	
TYPE OF DATA:	VOLATILES			
	DILUTION FACTOR:	1.2	2.3	1.0

DET. LIMIT	SAMPLE NUMBER:	CEN84	CEN88	CEN85
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	ug/l
5.00 methylene chloride		5.00 B	10.00 B	2.00 J
10.00 acetone		23.00 B		
5.00 carbon disulfide		4.00 J	2.00 J	
5.00 chloroform				
10.00 2-butanone				
5.00 trichloroethene				
5.00 tetrachloroethene				
5.00 toluene				
5.00 ethylbenzene				
5.00 styrene				
5.00 total xylenes				
TYPE OF DATA:	SEMIVOLATILES			
	DILUTION FACTOR:	80.0	83.0	0.0

DET. LIMIT	SAMPLE NUMBER:	CEN84	CEN88	CEN85
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	n/a
10.00 4-methylphenol				
10.00 naphthalene				
10.00 2-methylnaphthalene				
10.00 acenaphthene				
10.00 dibenzofuran				
10.00 fluorene			110.00 J	
10.00 phenanthrene		390.00 J	660.00 J	
10.00 anthracene			200.00 J	
10.00 di-n-butyl phthalate				
10.00 fluoranthene		950.00 J	810.00 J	
10.00 pyrene		1100.00	560.00 J	
10.00 benzo(a)anthracene		580.00 J	250.00 J	
10.00 bis(2-ethylhexyl) phthalate		160.00 B	160.00 B	
10.00 chrysene		650.00 J		
10.00 di-n-octyl phthalate				
10.00 benzo(b)fluoranthene		890.00		
10.00 benzo(k)fluoranthene		480.00 J		
10.00 benzo(a)pyrene		610.00 J		
10.00 indeno(1,2,3-cd)pyrene		240.00 J		
10.00 dibenz(a,h)anthracene				
10.00 benzo(g,h,i)perylene		400.00		
TYPE OF DATA:	PESTICIDES			
	DILUTION FACTOR:	400.0	400.0	0.0

	SAMPLE NUMBER:	CEN84	CEN88	CEN85
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	n/a

Comments:

= result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3-9005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER

SAMPLING DATE(s): 06-27-90  
 CASE NUMBER: 14399  
 STATE/COUNTY CODE: 0011  
 EPA NUMBER: DC14

	SAMPLE NUMBER:	CEN84	CEN88	CEN85
	SAMPLE ID:	S-back	Sd-2	1, tripbk
	LOCATION:	backgrd. surface rest.access brw,silt,cly	sediment same locSw 2 openacc,offs red,sandy	Trip blank blank for solids
	PH:	6.3	6.2	
	FIELD MEASUREMENTS:	none>0kg	none > 0kg	none>0kg
	PERCENT SOLIDS:	8.0%	44.0%	
TYPE OF DATA:	PESTICIDES			
	DILUTION FACTOR:	390.0	400.0	

DET. LIMIT	SAMPLE NUMBER:	CEN84	CEN88	CEN85
CRQL (@=IDL)	UNITS:	ug/kg	ug/kg	n/a

0.10 4,4'-DDT  
 Comments:

@ result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
TDD NUMBER: F3-9005-31  
LAB NAMES: Organic-Clayton Novi

SELECTED SAMPLE ORDER  
SAMPLING DATE(s): 06-27-90  
CASE NUMBER: 14399  
Inorganic-Rocky Mountain Analytical

STATE/COUNTY CODE: 0011  
EPA NUMBER: DC14

SAMPLE NUMBER:		MCDT88	MCDT89	MCDT91	MCDT92	MCDX29	MCDX30
SAMPLE ID:		Sw-1	Sw-2	Sw-3	Aq-blank	S-1	S-2
LOCATION:		drain, strm upstream rest. access clr, no odor	drain, stream dnstr, offst open access oily, foamy	duplicate of Sw-2	aqueous blank	on-site surf rest. access sandy loam lt brw. no odr	onsite surf. rest. access dark brown much debris
PH:		6.0	5.6	5.6	3.7	7.0	7.5
FIELD MEASUREMENTS:		225 umhos/cm	5220umhos/cm	5220umhos/cm	1 umho/cm	none>bkg	none>bkg
PERCENT SOLIDS:						91.8%	84.8%
TYPE OF DATA:		INORGANICS					
DILUTION FACTOR:		: GFAA	1.000	1.000	1.000	0.218	0.236
		: ICP	1.000	1.000	1.000	0.218	0.236
		: Hg	1.000	1.000	1.000	0.545	0.590
		: CN	1.000	1.000	1.000	0.055	0.059

DET. LIMIT	SAMPLE NUMBER:		MCDT88	MCDT89	MCDT91	MCDT92	MCDX29	MCDX30
CRQL (@=IDL)	UNITS:		ug/l	ug/l	ug/l	ug/l	mg/kg	mg/kg
25.00	aluminum		58.40	104000.00	92800.00		8070.00	21900.00
24.00	antimony						5.30 L	17.90 L
1.00	arsenic				2.30 L		2.40 J	4.60 J
2.00	barium		46.20	1270.00	1040.00		115.00	501.00
1.00	beryllium			93.10	65.90		0.45 J	0.44 J
5.00	cadmium						3.30	6.70
66.00	calcium		39300.00	139000.00	126000.00	86.80	27500.00 J	37600.00 J
5.00	chromium			271.00	270.00		23.80	75.20
6.00	cobalt			797.00	584.00		5.60	10.10
4.00	copper		10.80 B	876.00	659.00		101.00 J	439.00 J
22.00	iron		469.00	442000.00	420000.00	92.00	15200.00 J	59700.00 J
2.00	lead (anal. by GFAA)		3.60					
22.00	lead (anal. by ICP)			1360.00	935.00		296.00 J	2000.00 J
76.00	magnesium		7650.00	62800.00	59100.00		4740.00 J	4510.00 J
8.00	manganese		178.00	8950.00	6940.00		611.00	1010.00
0.20	mercury			0.50 J	0.80 J		0.39	0.61
10.00	nickel			297.00	237.00		33.00 L	74.10 L
115.00	potassium		3090.00	62600.00	55400.00		840.00	1290.00
2.00	selenium			27.00 J	27.00 J			
6.00	silver						1.90	9.30
1100.00	sodium		8220.00	1260000.00	1200000.00		956.00	1750.00
4.00	vanadium			871.00	853.00		21.90 J	55.30 J
1.00	zinc		24.80 B	4770.00	3360.00	9.80	560.00 J	1750.00 J
10.00	cyanide				12.30			

Comments:

@= result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3-9005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(s): 06-27-90  
 CASE NUMBER: 14399

STATE/COUNTY CODE: 0011  
 EPA NUMBER: DC14

SAMPLE NUMBER:		MCDX31	MCDX33	MCDX34	MCDT85	MCDT86	MCDX32
SAMPLE ID:		S-3	S-5	S-6	S-7	S-8	Sd-1
LOCATION:		offsite surf composite	ons, rest, acc 20" subsoil	Duplicate of S-5	ons, rest, acc 18" subsoil	ons, rest, acc 12" sub soil	same locat. as S-1
		med brw, rocky open access	drk. brw, clay oily smell		drk brwn rocky, sandy	drk brwn rocky, sandy	light brown claylike
PH:		6.5	7.1	7.0	7.3	7.4	5.7
FIELD MEASUREMENTS:		none >bkg	none >bkg	none >bkg	none >bkg	none >bkg	none >bkg
PERCENT SOLIDS:		91.7%	84.0%	90.9%	84.5%	89.2%	80.6%
TYPE OF DATA:		INORGANICS					
DILUTION FACTOR:		: GFAA	0.218	0.238	0.220	0.237	0.248
		: ICP	0.218	0.238	0.220	0.237	0.248
		: Hg	0.545	0.595	0.550	0.591	0.620
		: CN	0.055	0.060	0.055	0.056	0.062

DET. LIMIT	SAMPLE NUMBER:		MCDX31	MCDX33	MCDX34	MCDT85	MCDT86	MCDX32
CRQL (@=IDL)	UNITS:		mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
25.00	aluminum		5210.00	6850.00	5700.00	16700.00	7480.00	7750.00
24.00	antimony				6.50 L	9.80 L		
1.00	arsenic		1.90 J		0.62 J	4.40 J	2.80 J	2.20 J
2.00	barium		46.20	19.60	26.80	161.00	104.00	82.20
1.00	beryllium			0.63 J				0.53 J
5.00	cadmium		1.20			7.20	2.10	
66.00	calcium		9030.00 J	1630.00 J	17100.00 J	23700.00 J	26000.00 J	2980.00 J
5.00	chromium		18.20	26.40	17.50	35.80	28.90	14.70
6.00	cobalt		6.40	3.50	4.70	10.30	6.70	9.80
4.00	copper		28.80 J	23.90 J	74.10 J	985.00 J	79.80 J	211.00 J
22.00	iron		21100.00 J	41100.00 J	16900.00 J	25100.00 J	19000.00 J	18000.00 J
2.00	lead (anal. by GFAA)			6.40 J				
22.00	lead (anal. by ICP)		83.80 J	J	614.00 J	427.00 J	376.00 J	58.10 J
76.00	magnesium		2610.00 J	510.00 J	3910.00 J	4030.00 J	11500.00 J	1460.00 J
8.00	manganese		174.00	83.50	105.00	320.00	222.00	235.00
0.20	mercury					0.36	0.28	
10.00	nickel		30.50 L	5.80 L	33.60 L	74.00 L	53.90 L	12.40 L
115.00	potassium		615.00	399.00 B	417.00 B	1200.00	623.00	755.00
2.00	selenium							
6.00	silver					2.60	1.40	
1100.00	sodium					2940.00	2670.00	
4.00	vanadium		36.50 J	102.00 J	54.30 J	28.00 J	29.80 J	28.70 J
1.00	zinc		104.00 J	51.40 J	450.00 J	1080.00 J	350.00 J	86.50 J
10.00	cyanide							

Comments:

@= result reported from re-analysis

SITE NAME: St. Elizabeth's Hospital  
 TDD NUMBER: F3-9005-31  
 LAB NAMES: Organic-Clayton Novi Inorganic-Rocky Mountain Analytical

SELECTED SAMPLE ORDER  
 SAMPLING DATE(s): 06-27-90  
 CASE NUMBER: 14399  
 STATE/COUNTY CODE: 0011  
 EPA NUMBER: DC14

SAMPLE NUMBER:	MCDT90	MCDT87
SAMPLE ID:	Sd-2	S-back
LOCATION:	sediment	backgrd.
	same loc sw-2	surface
	open acc, offs	rest. access
	red, sandy	brw, silt, cly
PH:	6.2	6.3
FIELD MEASUREMENTS:	none > bkg	none > bkg
PERCENT SOLIDS:	76.6%	83.1%
TYPE OF DATA:	INORGANICS	
DILUTION FACTOR:	: GFAA 0.261	0.241
	: ICP 0.261	0.241
	: Hg 0.653	0.602
	: CN 0.065	0.060

DET. LIMIT	SAMPLE NUMBER:	MCDT90	MCDT87
CRQL (@=IDL)	UNITS:	mg/kg	mg/kg
25.00	aluminum	2220.00	9010.00
24.00	antimony		
1.00	arsenic	0.73 J	5.10 J
2.00	barium	14.20	67.00
1.00	beryllium	0.67 J	
5.00	cadmium		
66.00	calcium	501.00 J	4310.00 J
5.00	chromium	12.00	18.60
6.00	cobalt	11.90	5.30
4.00	copper	17.70 J	46.10 J
22.00	iron	14800.00 J	15700.00 J
2.00	lead (anal. by GFAA)	22.30 J	
22.00	lead (anal. by ICP)		291.00 J
76.00	magnesium	224.00 J	1640.00 J
8.00	manganese	143.00	182.00
0.20	mercury		0.24
10.00	nickel	4.00 L	14.10 L
115.00	potassium	390.00 B	877.00
2.00	selenium		
6.00	silver		
1100.00	sodium		
4.00	vanadium	32.50 J	34.60 J
1.00	zinc	40.10 J	118.00 J
10.00	cyanide		

Comments:

@= result reported from re-analysis

## 7.2 Quality Assurance Review

### 7.2.1 Organic Data: Lab Case 14399

#### 7.2.1.1 Summary

One aqueous sample and 10 solid samples were analyzed for volatile, acid, base-neutral, and pesticide/polychlorinated biphenyl (PCB) compounds through the EPA Contract Laboratory Program (CLP). Four aqueous samples (one trip blank and three surface water samples) were analyzed only for volatile organic compounds. Included in the sample set were two field duplicate pairs and one field blank.

The data have been fully reviewed to determine the usability of results according to the National and Regional guidelines. (Areas examined in detail are listed in the Support Documentation appendix.) Data quality was acceptable for most compounds with detection limit capability demonstrated by meeting criteria for holding times, surrogate and matrix spike recoveries, and instrument tuning and calibration. Blank contamination affected low levels of common volatile compounds and three phthalate compounds. There were a few noteworthy quality control problems.

Principal areas of concern include blank contamination, a few slightly high volatile surrogate recoveries, several low semivolatile internal standard areas, and a few low semivolatile surrogate and matrix spike recoveries. Several re-analyses were evaluated by the reviewer.

#### 7.2.1.2 Qualifiers

- Samples CEN76 through CEN78 were re-analyzed for volatile compounds because the toluene surrogate recoveries were slightly above quality control (QC) limits. The re-analyses exhibited similar surrogate recoveries. The following table indicates which results have been reported for each sample and the criterion used for each decision.

Sample Number	Analysis Reported	Compounds	Result Reported	Decision Criterion
CEN76	initial	methylene chloride	36 ug/kg	7
	re-analysis	acetone	not detected	2
	initial	carbon disulfide	85 ug/kg	4
	initial	toluene	19 ug/kg	3
	re-analysis	styrene	not detected	2
CEN77	re-analysis	methylene chloride	380 ug/kg	3
	re-analysis	acetone	110 ug/kg	1
	re-analysis	carbon disulfide	280 ug/kg	8
	initial	trichloroethene	3 ug/kg	5
	re-analysis	tetrachloroethene	52 ug/kg	4
	initial	toluene	70 ug/kg	3
	initial	ethyl benzene	3 ug/kg	5
	initial	styrene	12 ug/kg	7
	initial	xylene	17 ug/kg	4
CEN78	re-analysis	methylene chloride	48 ug/kg	6
	initial	acetone	not detected	2
	re-analysis	carbon disulfide	12 ug/kg	4
	re-analysis	toluene	4 ug/kg	9

#### Decision Criteria

- Both results were questioned by the blanks; the lowest result has been reported.
- This compound was detected in only one analysis and that result was questioned by the blanks. The "not detected" result was reported.
- Both results for this compound were too high to be questioned by the blanks. Therefore, the highest result was reported.

4. This compound was detected in both analyses and was not detected in any blanks. The highest result has been reported.
  5. This compound was detected in only one analysis and was not detected in any blanks. Therefore, the positive result has been reported.
  6. One result for this compound was questioned by the blanks, but the second result was above the range considered attributable to blank contamination. Therefore, the highest result has been reported.
  7. The results for this compound were the same in both analyses. Since the quality control data were very similar, the result from the initial analysis has been reported.
  8. One result exceeded the calibration range of the instrument, and the second result was within the calibration range. The result within the calibration range has been reported.
  9. This compound was detected in only one analysis at a level too high to be questioned by the blanks. Therefore, this positive result has been reported.
- All results for methylene chloride (except in samples CEN85, CEN77, and CEN78), acetone, styrene, di-n-butyl phthalate, di-n-octyl phthalate, and bis(2-ethylhexyl) phthalate have been flagged as undetected due to blank contamination (B). The results for these laboratory contaminants were not significantly higher in the samples than in all associated blanks.
  - The result reported for methylene chloride in sample CEN77 has been flagged as unreliable (R). The instrument level results in both analyses for this sample were above the range considered attributable to blank contamination. However, the result in the re-analysis (performed with a two-fold dilution) was more than five times higher than the initial result. (The instrument level for the re-analysis was three times higher than the initial analysis.) This high variability in results, coupled with the prevalence of this compound as a laboratory contaminant, suggests that it is not possible to determine if methylene chloride is actually indigenous to this sample location. Further information may be useful in verifying methylene chloride is present at this sampling location.

- The result for methylene chloride in sample CEN78 has been flagged as unreliable (R). The instrument level of the reported result is only slightly higher than the range considered attributable to blank contamination.
- All volatile results in samples CEN76, CEN77, CEN78, and CEN82 are considered estimated because of the slightly high surrogate recoveries. These results have been flagged as estimated (J), unless previously flagged.
- Even though flagged (B), the result for styrene may be real in sample CEN77. The presence of other alkyl benzenes in this sample may corroborate the presence of this compound. Further information may be useful in determining if this compound is actually present in this sample.
- The laboratory re-analyzed the semivolatile fraction of solid samples CEN78 through CEN81. The areas for the fifth internal standard ( $d_{12}$ -chrysene) were contractually low in samples CEN78, CEN80, and CEN81. The areas for the sixth internal standard ( $d_{12}$ -perylene) were contractually low in all four samples. These areas were similarly low in the re-analyses. Because the quality control data are similar in both analyses of each sample, the reviewer has reported the highest results for each compound, with the exception of di-n-butyl phthalate, bis(2-ethylhexyl) phthalate, and di-n-octyl phthalate. (All results for these laboratory contaminants were questioned by the blanks.) The Support Documentation appendix contains a summary of which results were reported for each affected sample.
- The detection limits for undetected polynuclear aromatic hydrocarbons (PAHs) and the positive results for detected PAHs eluting after fluorene may be higher than reported and are flagged (L) in sample CEN78. The areas for the perylene internal standard were quite low for both analyses of this sample. The areas for this internal standard were quite low for both analyses of sample CEN80 as well. Detection limits for late-eluting PAHs (eluting after fluorene) may be biased low in this sample as well.
- The internal standard areas were quite low for both chrysene and perylene for both analyses of sample CEN81. Consequently, detection limits for all PAHs may be higher than reported in this sample.

- The detection limits for phenol may be higher than reported in sample CEN90. The recovery for the phenol surrogate was low in this sample.
- A slightly low recovery was noted for 4-nitrophenol in the medium-level matrix spike analysis of solid sample CEN83. The detection limit for this compound may be slightly higher than reported in this sample.
- A comparison of the initial and matrix spike/ matrix spike duplicate (MS/MSD) analyses of sample CEN82 indicated the possibility of sample inhomogeneity for this sample. The results for phenanthrene, fluoranthene, benzo(a)anthracene, chrysene, and benzo(a)pyrene were substantially higher in the MSD analysis than in the initial and MS analyses. [The results for these compounds were all greater than the contract required detection limit (CRDL) for the MSD analysis.] The reviewer added benzo(k)fluoranthene, dibenzofuran, fluorene, and dibenz(a,h)anthracene to the data summary for this sample; these compounds were detected only in the MSD analysis. [The result for benzo(k)fluoranthene should also be considered estimated because the level in the MSD was substantially greater than the CRDL.] These results have been flagged as tentatively identified because no sample spectra were provided for the MS/MSD analyses. The results for phenanthrene, fluoranthene, benz(a)anthracene, chrysene, benzo(a)pyrene, and benzo(k)fluoranthene may be considered estimated in all solid samples because of the possibility of sample inhomogeneity. These results have been flagged (J), unless previously flagged (L) or (N).
- The result for 4,4'-DDT has been flagged as unreliable (R) in sample CEN76. There is no evidence of either DDD or DDE in this sample; without the corroborating presence of these degradation products of DDT, this result should not be considered confident without further information.
- Sample results that are below the calibration range of the instrument have been flagged as estimated (J), where no other flag exists.
- Tentatively identified compounds that are not considered to be laboratory artifacts are summarized immediately following this report.

7.2.1.3 Support Data

The Support Documentation appendix to this report documents the above findings associated with blank contamination, low semivolatile surrogate and matrix spike recoveries, low internal standard areas, slightly high toluene surrogate recoveries, the addition of four semivolatile results to the data summary, and information regarding the evaluation of multiple results for several samples. (Issues pertaining to laboratory contractual compliance are found on a separate summary directed to the laboratory technical project officer.)

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SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION		QUALIFIER CODE	COMPOUND NAME
		VALUE	UNITS		
Cen76	VOA				ND
	BNA	650	ug/kg		molecular sulfur
Cen77	VOA	-			ND
	BNA	370	ug/kg		molecular sulfur
Cen78	VOA				ND
	BNA	1300	ug/kg	TOT/iso	C <sub>17</sub> H <sub>12</sub> PAH such as methylpyrene
		540		UNK	poss. benzo (b) naphthoanthracene
		980			Satd HC
Cen79	VOA				ND
	BNA	1800	ug/kg	TOT/unk	unknowns (2)
Cen80	VOA				ND
	BNA	8000	ug/kg	TOT	Satd HC (8)
Cen81	VOA				ND
	BNA	6200	ug/kg	TOT	Satd HC (6)
Cen82	VOA				ND
	BNA	5800	ug/kg	TOT	molecular sulfur (2)
		770		unk/mix	unsatd HC of unk. subst. + sulfur
		2600		TOT	terpane HC (3)
		1200			Satd HC

DEFINITIONS OF QUALIFIER CODES:

SUS = SUSPECTED FALSE POSITIVE RESULT: Compound is either a common laboratory contaminant, or else a possible reaction byproduct (artifact) attributable to the chemical reagents used for sample preparation and analysis. This result is suspect even though this compound was not found in any associated blanks.

UNK = UNKNOWN COMPOUND: Library search result unreasonable or of very low matching quality.

TOT = TOTAL CONCENTRATION REPORTED: Represents the sum of several compounds detected all belonging to the same chemical class.

ISO = OR ISOMER: Compound identification is not selective for this isomer only. This result may instead represent the presence of a similar compound comprised of the same atoms bonded together in a different arrangement or substitution pattern.

SAT HC = SATURATED HYDROCARBON

UNSAT HC = UNSATURATED HYDROCARBON

HC = HYDROCARBON

PAH = polynuclear aromatic hydrocarbon

SUB = SUBSTITUTED

MIX = MIXTURE OF 2 OR MORE COELUTANTS

ND = NONE DETECTED

1 of 2

**SAMPLE DATA SUMMARY: ORGANIC TENTATIVELY IDENTIFIED COMPOUNDS**

SAMPLE NUMBER	ANALYSIS FRACTION (VOA/BNA)	ESTIMATED CONCENTRATION		QUALIFIER CODE	COMPOUND NAME
		VALUE	UNITS		
CEN83	VOA	78	ug/kg	ISO	C <sub>10</sub> H <sub>16</sub> - such as camphene
		28		PT/unk	unsatd HC of unknown subst (2)
		12		OC/unk	C <sub>9</sub> H <sub>12</sub> - C <sub>3</sub> -alkyl/benzene + unk
		10		unk	unk unsatd HC + poss subst-benzene
	BNA	22,000			sulfur
CEN84	VOA	57	ug/kg	unk	possible cyclic HC
		43		iso	C <sub>10</sub> H <sub>16</sub> - such as camphene
		21		iso	C <sub>3</sub> -alkyl benzene (C <sub>9</sub> H <sub>12</sub> )
	BNA	3500		unk	unknown
		650		unk	unknown mix of aromatic HCs
		6400		TOT	satd HC (3)
		4500		PT/unk	unsatd HC of unknown subst (2)
CEN86	VOA				ND
CEN87	VOA				ND
CEN88	VOA	50	ug/kg	iso	C <sub>9</sub> H <sub>12</sub> - C <sub>3</sub> alkyl/benzene
	BNA				ND
CEN89	VOA				ND

**DEFINITIONS OF QUALIFIER CODES:**

**SUS = SUSPECTED FALSE POSITIVE RESULT:** Compound is either a common laboratory contaminant, or else a possible reaction byproduct (artifact) attributable to the chemical reagents used for sample preparation and analysis. This result is suspect even though this compound was not found in any associated blanks.

**UNK = UNKNOWN COMPOUND:** Library search result unreasonable or of very low matching quality.

**TOT = TOTAL CONCENTRATION REPORTED:** Represents the sum of several compounds detected all belonging to the same chemical class.

**ISO = OR ISOMER:** Compound identification is not selective for this isomer only. This result may instead represent the presence of a similar compound comprised of the same atoms bonded together in a different arrangement or substitution pattern.

SAT HC = SATURATED HYDROCARBON

UNSAT HC = UNSATURATED HYDROCARBON

HC = HYDROCARBON

PAN = polynuclear aromatic hydrocarbon

SUB = SUBSTITUTED

MIX = MIXTURE OF 2 OR MORE COELUTANTS

ND = NONE DETECTED

## 7.2.2 Inorganic Data: Lab Case 14399

### 7.2.2.1 Summary

Ten solid samples and 4 unfiltered aqueous samples were analyzed for total metals and cyanide through the EPA CLP under case 14399. Included in the sample set were one unfiltered aqueous duplicate pair, one solid duplicate pair, and one field blank. The laboratory divided the samples into two sample delivery groups (SDGs). With the exception of blank contamination, no quality control data have been cross-applied between SDGs.

The data have been fully reviewed to determine the usability of results according to the National and Regional guidelines. (Areas examined in detail are listed in the Support Documentation appendix.) Data quality was good for most metals and for cyanide. Detection limit capability was demonstrated for most analytes by meeting criteria for holding times, spike recoveries, calibration check standards, low-level standards, and linear range analyses. Several quality control problems affected a large number of results, however.

Areas of concern include blank contamination, laboratory duplicate imprecision, matrix spikes that were out of control limits, low post-digestion spike recoveries, serial dilution imprecision, and several results changed on the data summary because of laboratory rounding as well as a calculation error. One result was added to the data summary.

### 7.2.2.2 Qualifiers

- Several metals were detected in the laboratory and field blanks associated with this case. However, only five results have been flagged (B), undetected, due to blank contamination. These results include the following: copper in sample MCDT88; potassium in samples MCDT90, MCDX33, and MCDX34; and zinc in sample MCDT88.
- Low matrix spike recoveries were obtained for antimony for aqueous sample MCDT89 and solid sample MCDT85. In both cases, the post-digestion spike recoveries were acceptable, suggesting that this analyte was lost upon sample digestion. Consequently, positive results for antimony have been flagged biased low (L) in samples MCDX34, MCDT85, MCDX29, and MCDX30. The detection limits for this metal may be higher than reported in all other samples.

- A low matrix spike recovery for arsenic was noted for aqueous sample MCDT89. The post-digestion spike recovery was good, indicating loss of this analyte upon digestion. Therefore, the positive results in sample MCDT91 may be higher than reported and have been flagged (L). The detection limits for arsenic may be higher than reported in samples MCDT88 and MCDT89 (similar monitoring well samples).
- The reviewer added 27 ug/l for selenium to the data summary for aqueous sample MCDT89. The initial analysis for this sample and the laboratory duplicate of this sample indicated that selenium was present at this sampling location at a level that exceeded the CRDL. However, because of unusual matrix and post-digestion spike behavior, the sample and the duplicate were re-analyzed at a 10-fold dilution. The post-digestion spike recoveries were better for the sample and the laboratory duplicate. The same series of analyses were performed on the field duplicate sample, MCDT91, with comparable results. Consequently, selenium has been reported for sample MCDT89 and flagged (J) estimated. The result for sample MCDT91 is also considered estimated, because the matrix spike effect is not conclusive regarding direction of bias. Although these results may be higher than reported, further information would be necessary in determining the accurate ("true") selenium level at this sampling location (SW-2). Moderate levels of many other metals (0.1 to 1.2 mg/l) and the oily, foamy matrix may be a cause for the analytical problems encountered in these two samples.
- The detection limits for selenium may be higher than reported by the laboratory in samples MCDT85 and MCDX34. The matrix spike and post-digestion spike recoveries were low in solid sample MCDT85, suggesting a sample-specific matrix effect. The post-digestion spike recovery was also low in sample MCDX34, although not low enough to require dilution and re-analysis.
- Unusual matrix spike recoveries were noted for copper and lead in solid sample MCDT85. The spiked sample result was lower than the initial, unspiked result for copper, and the spiked sample result was higher than would be expected for lead. These data suggest a substantial degree of sample inhomogeneity for both metals, which is corroborated by laboratory duplicate imprecision for copper in sample MCDT85. Consequently, all solid results for these two metals have been flagged as estimated (J).

- Significant disagreement between plasma and furnace lead values were seen for samples MCDT86, MCDX30, MCDX33, and MCDX34, further supporting the contention that these lead results should be considered imprecise due to inhomogeneity. Further information or analyses may be useful in determining which results best represent the indigenous levels at these sampling locations.
- Laboratory duplicate imprecision for sample MCDT85 was observed for zinc; all solid results for this metal have been flagged as estimated (J).
- The matrix spike recovery for nickel was 57 percent in solid sample MCDT85. The post-digestion spike recovery was 68 percent, suggesting primarily that a sample-specific matrix effect occurred that suppressed the detection of nickel in this sample. Because no other post-digestion spike analyses were performed, the results for nickel in all solid samples may also be similarly affected and have been flagged (L), ~~biased low~~.
- Field duplicate imprecision was displayed for arsenic, beryllium, lead, copper, iron, calcium, magnesium, nickel, vanadium, and zinc between solid samples MCDX33 and MCDX34. All solid results for these metals have been flagged as estimated (J), except where previously flagged. Sample inhomogeneity is most likely the cause for this observed imprecision (further supporting the conclusion already drawn for lead and copper).
- Field duplicate imprecision was observed for mercury between aqueous samples MCDT89 and MCDT91. These results have been flagged as estimated (J).
- The reviewer changed the mercury results in samples MCDT86, MCDX29, and MCDX30. The laboratory rounded off the initial results for samples MCDT86 and MCDX29, resulting in final results that were substantially different than those calculated by the reviewer, using one more significant figure. The result for sample MCDX30 was miscalculated by the laboratory.
- All lead results were reported from the plasma analysis except for the results in aqueous sample MCDT88 and solid samples MCDT90 and MCDX33. With the exceptions already discussed, fairly good agreement exists between the two methods for all solid samples and aqueous samples MCDT89 and MCDT91.

#### 7.2.2.3 Support Data

The Support Documentation appendix to this report documents the above findings associated with blank contamination, outlying matrix and post-digestion spike recoveries for several metals, laboratory duplicate imprecision, results changed or added to the data summary, and serial dilution imprecision. This report has been formatted to address those issues directly affecting the application of the data to the subject investigation. (Issues pertaining to laboratory contractual compliance are addressed on a separate form directed to the laboratory technical project officer.)

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DRAFT

SECTION 8

## 8.0 TOXICOLOGICAL EVALUATION

### 8.1 Summary

Surface and subsurface soil and sediment samples revealed trace to low levels of volatile organic contaminants (VOCs), higher concentrations of a number of semivolatile contaminants (SVOCs) including polynuclear aromatic hydrocarbons (PAHs), and notable levels of five metals including lead. Under conditions of exposure expected for this site, predicted intakes for VOCs, SVOCs, and metals are below reference doses (RfDs) or other lowest observed adverse effect levels (LOAELs) where such criteria or levels exist. Inhalation and dermal exposures to reported contaminant levels are also not expected to result in significant contaminant exposures. Increased risks of cancer due to the presence of traces of trichloroethene (TCE) and tetrachloroethene (PCE) in surface soil cannot be ruled out but are expected to be well below  $10^{-6}$ .

In the case of PAHs and lead for which no RfDs have been developed, predicted exposures for these common urban contaminants may not significantly exceed those normally encountered by urban dwellers or workers. It is desirable to reduce avoidable exposure to lead wherever possible, however. Several PAHs and lead are also classified as probable human carcinogens, and any exposure (even typical urban exposure) may result in an increased risk of cancer.

Aqueous samples from a site-coursing drainage stream revealed a trace of chloroform and several metals in excess of criteria protective of aquatic life. The presence of suspended particulates that may artificially elevate metal concentrations cannot be ruled out. This stream is not expected to support aquatic life, and dilution downstream of the site may reduce contaminant concentrations. A downstream drainage stream sediment sample revealed no significant contaminant levels.

### 8.2 Support Documentation

#### 8.2.1 Organic Contaminants

Analysis of surface and subsurface samples from various locations on the St. Elizabeth's Hospital property revealed trace to low levels of VOCs such as carbon disulfide (up to 280 ug/kg), 2-butanone (20 ug/kg), TCE (3ug/kg), PCE (up to 93 ug/kg), toluene (up to 70 ug/kg), ethylbenzene (3 ug/kg), and xylene (up to 17 ug/kg). Reported SVOCs included 4-methylphenol (510 ug/kg) and various PAHs (up to 10,206 ug/kg). The highest levels of these contaminants, with the exception of PAHs and PCE, were measured in sample S-2, obtained from the dry drainage ditch in the center of the site.

Although the property is fenced, access by persons living in proximity to the site is apparently not reliably restricted (see site observations). Similarly, patients and workers associated with the hospital may be considered at risk of exposure to contaminants reported in surface media. Exposure routes of concern may include inhalation of windborne particulates, inadvertent ingestion of soil on hands, etc., and dermal absorption following direct contact. No HNU readings above background were obtained on site, suggesting that no significant levels of organic vapors are present in ambient air. For this site, subsurface samples, which were obtained at depths of 12 inches or greater, are not considered available for direct contact or inhalation.

Dermal absorption of the reported contaminants from a soil matrix may not be a significant exposure route; dermal exposure is generally a concern of occupationally exposed workers who are exposed to high contaminant levels. Reported concentrations of VOCs and 4-methylphenol are relatively low and significant doses may not be dermally absorbed from soil under conditions of exposure expected for this site. In some cases (TCE and PCE, for example), dermal absorption during high-level industrial exposures is not considered significant.<sup>1</sup> PAHs, reported at higher concentrations on site, strongly adsorb to soil matrices and may not cross the skin in significant quantities from this medium.

Inhalation of windborne particulates by persons on the site may occur but cannot be quantified with available information. The trace to low levels of VOCs and 4-methylphenol reported on site, along with expected dilution by wind upon release of soil particulates to the air, suggest that inhalation exposure to these contaminants may not be significant. PAH levels, while higher, are reported in surface soils at levels equivalent to or lower than those measured in the background sample. PAHs are common soil contaminants, especially in urban areas, and no site-related increases over PAH levels encountered elsewhere in an urban environment are indicated by these data.<sup>2</sup>

Inadvertent ingestion of soil on hands, etc. is also not expected to result in adverse effects due to the reported levels of VOCs or 4-methylphenol on this site. If a conservative exposure scenario that assumes that 100 mg of soil containing the highest reported levels of VOCs and 4-methylphenol is accidentally consumed each day is applied, resultant contaminant doses would fall below RfDs for noncarcinogenic effects for carbon disulfide, 2-butanone, toluene, ethylbenzene, xylene, and 4-methylphenol.<sup>3</sup> No RfDs have been developed for TCE and PCE due to their classification as Group B2 (probable) human carcinogens.<sup>3</sup> Based on suggested acceptable intakes for noncarcinogenic endpoints of toxicity of 0.52 mg per day for TCE and 0.17 mg per day for PCE, no noncarcinogenic effects would be expected.<sup>4</sup> Theoretical increases in cancer risk following exposure to the highest reported concentrations of TCE (3 ug/kg) and PCE (52 ug/kg) in surface soil would be less than  $10^{-6}$  for TCE and PCE for both adults (70-kilogram reference weight) and children (10 kilogram reference weight).<sup>3</sup>

Inadvertent ingestion of 100 mg per day of surface soil containing the reported PAH concentrations would result in expected doses that fall below RfDs for individual PAH compounds, where such guidelines exist.<sup>3</sup> No RfDs have been developed for PAHs that are classified as Group B2 probable human carcinogens such as pyrene, benz(a)anthracene, chrysene, benzo(b)- and benzo(k) fluoranthene, benzo(a) pyrene (BAP), indeno(1,2,3-cd)pyrene, dibenz(a,h)anthracene, and benzo(g,h,i)perylene, which were reported on this site. Increased cancer risks following long-term exposure to levels of these PAHs reported in surface soil may be on the order of  $2 \times 10^{-5}$  for adults and  $1 \times 10^{-4}$  for children.<sup>5</sup> It may be noted that this risk is derived using a relative potency approach based on BAP, which has been assigned its former potency of  $11.5 \text{ (mg/kg/day)}^{-1.5}$ . Currently, no unit cancer risk is available for B2 PAHs; the old potency factor has been used to provide a rough estimate of risk in accordance with EPA Region III policy. Also, as formerly noted, on-site PAH levels are similar to those reported in the background sample and may not be unusual in an urban setting. Risks associated with exposure to PAHs in on-site soils may, therefore, be equivalent to those normally experienced by persons living or working in an urban setting.

Up- and downstream aqueous samples from an on-site drainage pathway revealed only chloroform at concentrations up to 0.8 ug/l in the downstream sample. Due to this contaminant's lack of persistence in surface media and its relative low toxicity to aquatic life (chronic lowest observed effect level of 1,240 ug/l), no adverse effects are expected.<sup>6</sup>

#### **8.2.2 Inorganic Contaminants**

Inorganic analysis of surface and subsurface soil samples revealed the presence of antimony (up to 17.9 mg/kg), cadmium (up to 7.2 mg/kg), copper (up to 985 mg/kg), lead (up to 2,000 mg/kg), and silver (up to 9.3 mg/kg) at levels exceeding upper range levels generally reported for nonpolluted United States soils.<sup>7,8</sup> Elevated metal levels were generally distributed throughout the site, with samples S-2 (dry drainage ditch) and S-7 (subsurface sample from a former fill area) exhibiting notable concentrations of all five above-noted inorganics.

No adverse noncarcinogenic effects via likely exposure routes are expected from the concentrations of metals reported for this site. Dermal absorption of metals from a soil matrix is not usually significant, especially at the levels reported for this site. Inhalation of windborne particulates is a possible exposure route, although it is not quantifiable with available information. At the reported metals concentrations, dilution would be expected to play a significant role in attenuating possible airborne exposure to metal concentrations in surface soil. In addition, a significant portion of inhaled particulates are subsequently swallowed and will be considered below.

Assuming inadvertent ingestion of 100 mg per day of the highest reported metal concentrations, doses that fall below RfDs for antimony, cadmium, and silver would result.<sup>3</sup> No RfD has been developed for copper or lead; in the case of copper, an acceptable intake of 2.6 mg per day can be predicted from the proposed Maximum Contaminant Level Goal (MCLG) of 1.3 mg/l in drinking water (based on a LOAEL of 5.3 mg).<sup>3</sup> These levels suggest that an intake of  $1.41 \times 10^{-3}$  mg/kg (adults) and  $9.87 \times 10^{-3}$  mg/kg (children) predicted from the highest reported copper soil concentration would pose no threats for this essential nutrient.

No RfD is available for lead, a common constituent of urban soil, dust, and air. Soil lead and dust levels have been reported as ranging from 150 mg/kg to 300 mg/kg for urban soil and as high as 20,000 mg/kg for urban street dust.<sup>9</sup> The occurrence of lead at up to 2,000 mg/kg in on-site soil is not surprising, considering the hospital's location and its use as a landfill for street sweepings and storm sewer cleanings.

Since lead is a common contaminant in the urban environment, urban dwellers and workers have unavoidable exposures to this heavy metal. Estimated baseline lead intakes have been reported at 88.2 ug per day for urban-dwelling adults and 137.6 ug per day for urban-dwelling children; additional sources of exposure may include urban gardens, houses with interior lead paint, and smoking.<sup>9</sup> Inadvertent ingestion of 100 mg of the highest lead concentration in surface soil would result in an intake of 200 ug, a level that exceeds baseline intakes predicted for urban dwellers. Actual exposure may be less since other soil lead levels ranged from 296 mg/kg to 614 mg/kg on site; 291 mg/kg of lead was measured in the background soil sample. It is desirable, especially for individuals who are most susceptible (such as infants, children, and pregnant women), to reduce one's exposure to this metal wherever possible. Lead is also classified as a Group B2 (probable) human carcinogen and any exposure may result in an increased cancer risk; however, it is recommended that quantitative estimates of cancer risk not be calculated for lead due to the considerable uncertainty in the estimates.<sup>10</sup>

Aqueous samples from the drainage stream that crosses the site revealed levels of several inorganics in excess of upstream concentrations as well as criteria protective of aquatic life. These inorganics included (in ug/l) aluminum (up to 104,000), chromium (up to 271), copper (up to 876), iron (up to 442,000), lead (1,360), mercury (up to 0.80), zinc (up to 4,770) and cyanide (up to 4,770). Ambient Water Quality Criteria for these contaminants are (in ug/l) aluminum, 87, chromium (hexavalent), 11, copper 5.2, iron, 1,000, lead, 1.3, mercury, 0.012, zinc, 110, and cyanide, 5.2.<sup>6,11</sup> This drainageway is not expected to support aquatic life and AWQCs are provided for comparison purposes. Also note that the drainage stream aqueous samples likely contained significant amounts of suspended particulates. These particulates may provide an adsorptive surface for metals and result in samples in which reported metal concentrations consist of metal-adsorbed particulates as well as dissolved metals. The outfall of this stream is not known; however, the nearest receiving water is one mile away, and dilution may reduce contaminant levels downstream of the site (see section 3.2). Also note that metals levels in sediment sampled at the downstream location were within ranges reported for nonpolluted United States soils.<sup>7,8</sup>

Report prepared by \_\_\_\_\_

Elizabeth A. Quinn, Senior Toxicologist

### LIST OF SOURCES

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5. ICF-Clement Associates. 1988. Comparative potency approach for estimating the cancer risk associated with exposure to mixtures of polycyclic aromatic hydrocarbons. Interim Final Report. ICF-Clement Associates, Fairfax, VA.
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8. Dragun, J. 1988. The Soil Chemistry of Hazardous Materials. Hazardous Materials Control Research Institute, Silver Spring, MD.
9. United States Environmental Protection Agency. 1986. Air Quality Criteria for Lead. Environmental Criteria and Assessment Office, Research Triangle Park, North Carolina. EPA 600/8-83-028.

10. Federal Register. 1988. Drinking Water Regulations; Maximum Contaminant Level Goals and National Primary Drinking Water Regulations for Lead and Copper; Proposed Rule. Volume 53, Number 160. August 18, 1988.
11. United States Environmental Protection Agency. 1988. Ambient Aquatic Life Water Quality Criteria for Aluminum. Office of Research and Development, Duluth, Minnesota. EPA 440/5-86-006.

DRAFT

## **APPENDIX A**

PROJECT NAME: ST. Elizabeth's Hosp.  
TDD NO.: F3900531

EPA SITE NO.: DC 14  
REGION: III

**SUPPORT DOCUMENTATION FOR THE REVIEW OF  
ORGANIC ANALYSIS LAB DATA PACKAGE**

CASE/SAS NO.: 14399  
TYPE OF ANALYSIS: low organic  
CONTRACT LABORATORY: Clayton  
APPLICABLE IFB OR SOW: 21st  
REVIEWER: R. Cohen  
REVIEW DATE: Jan 28, 1991

APPLICABLE SAMPLE NO's.: \_\_\_\_\_  
Can 76-90  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

THE FOLLOWING TABLE INDICATES AREAS WHICH WERE EXAMINED IN DETAIL, THE IDENTIFIED PROBLEM AREAS, AND SUPPORT DOCUMENTATION ATTACHMENTS:

	AREAS EXAMINED IN DETAIL				PROBLEM AREAS IDENTIFIED				SUPPORT DOCUMENTATION ATTACHMENTS			
	CHECK (✓) IF YES OR FOOTNOTE LETTER FOR COMMENTS BELOW				CHECK (✓) IF YES OR FOOTNOTE NUMBER FOR COMMENTS BELOW				CHECK (✓) IF YES OR IDENTIFY ATTACHMENT NO.			
	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB	ALL APPLICABLE ANALYSES	VOA	BNA	PEST/PCB
HOLDING TIMES	✓											
BLANK ANALYSIS RESULTS, TARGET COMPOUNDS	✓								✓			
BLANK ANALYSIS RESULTS, TENTATIVE I.D.s	✓								✓			
SURROGATE SPIKE RESULTS	✓								✓			
MATRIX SPIKE RESULTS	✓								✓			
DUPLICATE ANALYSIS RESULTS	✓											
TARGET COMPOUND MATCHING QUALITY	✓											
TENTATIVELY IDENTIFIED COMPOUNDS	✓											
DTTPP & BFB SPECTRUM TUNE RESULTS	✓											
GC INSTRUMENT PERFORMANCE	✓											
INITIAL CALIBRATIONS	✓											
CONTINUING CALIBRATIONS	✓											
QUANTITATION OF RESULTS	✓											
OTHERS	✓											

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_  
\_\_\_\_\_

# BLANK ANALYSIS RESULTS FOR TARGET COMPOUNDS

FRACTION	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H <sub>2</sub> O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
VCA	low aq lab blk		VBLKA 712	lab	5.5 17.4 15.4	<del>Mech</del> 1.5 ug/l <del>acetone</del> (w/100 RT) <del>5.0 ug/l</del> 2-chlorophenol 1.9 ug/l toluene 0.60 ug/l Mech 3.5 ug/l
VCA	low aq lab blk		VBIKAE 714	lab	5.4	
VCA	low aq lab blk		VBIKEB 715	lab	5.4	Mech 2.6 ug/l
VCA	low solid lab blk		VBIKEC 716	lab	5.4 6.3 34.7	Mech 2.1 ug/l acetone 28.4 ug/l styrene 2.3 ug/l (2)
VCA	low solid lab blk		VBIKED 717	lab	5.35 6.2	Mech 2.5 ug/l acetone 17.0 ug/l
VCA	low aq trip blk		CEN85	NUS	5.4	Mech 2.3 ug/l
VCA	low aq trip blk		CEN90	NUS		ND
BNA	low solid lab blk		SBIKSI	lab	33.2 26.4 35.0	Behp 9.34 ug/l dimethylph 2.50 ug/l (2) dimethylph 2.05 ug/l (2)
BNA	low aq lab blk		SBIKU1	lab		ND
BNA	med level solid blk		SBIKMI	lab	33.0	Behp 30.05 ug/l
BNA	low aq lab blk		CEN90	NUS		ND
PEST	solid blk aqueous blk		PBS PRW	lab		ND
PEST	aqueous field blk		(PNAO)	NUS		ND

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITHIN THE SAMPLE ANALYTICAL DATA SUMMARY. TENTATIVELY IDENTIFIED COMPOUNDS IN BLANKS ARE LISTED ON A SEPARATE FORM.

## COMMENTS:

(1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.

(2) RESULT INFERRED FROM QUANTITATION LIST, DIAGNOSTICS, CHROMATOGRAM AND/OR SPECTRA.

ND = none detected

14399

## BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

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ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

SAMPLE #	FRACTION	SCAN # (S) OR P.T	ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
VB1KA	VOA			ND	
VB1KAE	VOA			ND	
VB1KEB	VOA	7.1 min	6% ISO 9.3 min	MS	
VB1KEC	VOA	7.2 min	8% ISO 9.2 min		
		16.0	2% ISO 22.5		
		34.7	5% ISO 28.8	styrene	
VB1KED	VOA	7.1 min	8% ISO 9.2 min	MS	
		15.9 min	2% ISO 22.5 min	MS	
Cen85	VOA			ND	
Cen90	VOA	7.1 min	5% ISO 9.2 min	MS	
SB1KSI	BNA	2.8 min	660 (g) kg	(73, 90)	
		2.9	370	(75, 84, 114, 119) - aromatics	
		3.2	16,000	(54, 67, 82, 96, 113, 128)	IS: 10.5 min
		3.5	2700	(60, 95, 97, 130, 132) Chloroethane	
		6.0	2400	(43, 58, 84...)	14.2
		6.7	40000	(43, 59, 101)	19.7
		6.9	710	(43, 54, 69, 83, 101)	24.3
		8.3	400	(43, 87, 112)	32.7
		8.6	1200	(43, 95, 96, 128)	37.0
		9.0	750	(43, 69, 97, 112)	
		10.0	270	(43, 95, 112, 128)	
		10.1	450	(43, 71, 85, 101, 113)	
		11.3	1500	(43, 71, 86, 128)	
		12.4	420	(43, 57, 71, 85, 99)	
		12.8	400	(41, 91, 129, 243)	
		13.6	340	(57, 71, 98, 112, 148, 165, 207) Carboxylic acid	
		16.1	8% ISO 24.3	MS -	
		26.4	8%	di-n-butyl phthalate	
		26.6	9%		
		27.1	3%		
		27.7	5%		
		28.1	3%		
✓	✓	35.0	9% ISO 37.0	dimethyl phthalate	
SB1KW1	BNA	2.8 min	35 (g) kg	(56, 84...)	IS: 10.4
		3.1	720	(54, 67, 82...)	14.1
		3.4	130	(60, 95, 132) ICE	19.6
		6.5	10	(41, 54, 69, 83...)	24.2
		37.3	20	(207) styrene	32.6
					36.9

NLS = no library search conducted

# BLANK ANALYSIS RESULTS FOR TENTATIVELY IDENTIFIED COMPOUNDS

ALL TENTATIVELY IDENTIFIED COMPOUNDS FOUND IN BLANK ANALYSES ARE LISTED BELOW:

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SAMPLE #	FRACTION	SCAN # (S) OR R.T	ESTIMATED CONCENTRATION	COMPOUND NAME	COMMENTS
SBJKMI	BNA	2.8 min	9 mg/kg	(49, 55, 84)	
		3.1	110	(54, 67, 82)	
		28.4	12	(73, 84, 7, 221, 353)	siloxane
		30.0	64		IS
		31.6	110		10.4
		31.7	35	tri d ester of phosphoric acid	14.1
		34.4	220	siloxane	19.55
		35.3	20		24.2
		35.4	22		32.6
		35.7	640		36.9
		37.0	650		
		37.1	80		
		38.5	540		
		38.8	22		
		40.4	410		
		42.7	270		
		2.7	6% ISO 10.4 m	MS	
		2.9	8%		
		13.4	7% ISO 14.1		
		24.5	8% ISO 24.2		
		25.4	6% ISO		
✓	✓	10.2	8% ISO 10.4 m	✓	
CEN90	BNA	2.8 min	21 ug/l	(56, 84, 117)	
		3.1	640	(54, 67, 82)	
		3.4	120	KE	
		6.8	11	(41, 54, 69, 83, 129)	

NLS = no library search conducted

## WATER VOLATILE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76

	EPA	S1	S2	S3	OTHER	TOT
	SAMPLE NO.	(TOL)*	(BFB)*	(DCE)*		OUT
01	CEN85	97	96	94		0
02	CEN86	101	101	99		0
03	CEN87	89	105	88		0
04	CEN89	108	110	114		0
05	CEN90	96	101	99		0
06	CEN87MS	98	107	92		0
07	CEN87MSD	97	108	98		0
08	VLKBA	103	101	104		0
09	VLKEA	100	103	95		0
10	VLKEB	100	105	85		0

## QC LIMITS

S1 (TOL) = Toluene-d8 ( 88-110 )

S2 (BFB) = Bromofluorobenzene ( 85-115 )

S3 (DCE) = 1,2-Dichloroethane-d4 ( 76-114 )

\* Column to be used to flag recovery values

\* Values outside of contract required QC limits

D Surrogates diluted out

2B

## SOIL VOLATILE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Level: (low/med) LOW

EPA	S1	S2	S3	OTHER	TOT
SAMPLE NO.	(TOL)*	(BFB)*	(DCE)*		OUT
01: CEN76	126 *	78	100		1
02: CEN76RE	118 *	81	102		1
03: CEN77	130 *	78	97		1
04: CEN77DL	129 *	78	116		1
05: CEN78	120 *	85	101		1
06: CEN78RE	130 *	87	109		1
07: CEN79	98	98	95		0
08: CEN80	99	84	93		0
09: CEN81	102	83	93		0
10: CEN82	120 *	93	108		1
11: CEN83	108	88	96		0
12: CEN84	101	86	97		0
13: CEN88	95	97	96		0
14: CEN82MS	115	83	96		0
15: CEN82MSD	114	87	103		0
16: VBLKEC	99	99	92		0
17: VBLKED	100	100	96		0

## QC LIMITS

S1 (TOL) = Toluene-d8 ( 81-117)

S2 (BFB) = Bromofluorobenzene ( 74-121)

S3 (DCE) = 1,2-Dichloroethane-d4 ( 70-121)

# Column to be used to flag recovery values

\* Values outside of contract required QC limits

0 Surrogates diluted out

104

## SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CLAYTON NOVI Contract: 68-09-0035  
 Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: CEN76  
 Matrix Spike - EPA Sample No.: CEN82 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	57.5	0	50.0	87	59-172
Trichloroethene	57.5	0	45.4	79	62-137
Benzene	57.5	0	56.2	98	66-142
Toluene	57.5	3.59	64.9	107	59-139
Chlorobenzene	57.5	0	54.6	95	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene	57.5	55.9	97	-11	22 59-172
Trichloroethene	57.5	47.4	82	-4	24 62-137
Benzene	57.5	56.7	99	-1	21 66-142
Toluene	57.5	68.3	113	-5	21 59-139
Chlorobenzene	57.5	57.8	101	-6	21 60-133

\* Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 5 outside limits

Spike Recovery: 0 out of 10 outside limits

COMMENTS:

14399-3-110-05

3-110-06

1A  
VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EPA SAMPLE NO.

Lab Name: CLAYTON NOVIContract: 68-09-0035

CEN78

CEN78RE

Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SD6 No.: CEN76No.: CEN76Matrix: (soil/water) SOILLab Sample ID: 830239830239Sample wt/vol: 5.0 (g/mL) 6Lab File ID: E0919E0935Level: (low/med) LOWDate Received: 06/28/9006/28/90% Moisture: not dec. 10Date Analyzed: 07/06/9007/07/90Column: (pack/cap) PACKDilution Factor: 1.0or: 1.0

## CONCENTRATION UNITS:

CAS NO. COMPOUND (ug/L or ug/Kg) UG/KG Q

UG Q

74-87-3-----	Chloromethane	11	10	11	10
74-83-9-----	Bromomethane	11	10	11	10
75-01-4-----	Vinyl Chloride	11	10	11	10
75-00-3-----	Chloroethane	11	10	11	10
75-09-2-----	Methylene Chloride	5	10	48	10
67-64-1-----	Acetone	11	10	18	10
75-15-0-----	Carbon Disulfide	6	10	12	10
75-35-4-----	1,1-Dichloroethane	6	10	6	10
75-35-3-----	1,1-Dichloroethane	6	10	6	10
540-59-0-----	1,2-Dichloroethane (total)	6	10	6	10
67-66-3-----	Chloroform	6	10	6	10
107-06-2-----	1,2-Dichloroethane	6	10	6	10
78-93-3-----	2-Butanone	11	10	11	10
71-55-6-----	1,1,1-Trichloroethane	6	10	6	10
56-23-5-----	Carbon Tetrachloride	6	10	6	10
108-05-4-----	Vinyl Acetate	11	10	11	10
75-27-4-----	Bromodichloromethane	6	10	6	10
78-87-5-----	1,2-Dichloropropane	6	10	6	10
10061-01-5-----	cis-1,3-Dichloropropene	6	10	6	10
79-01-6-----	Trichloroethene	6	10	6	10
124-48-1-----	Dibromochloromethane	6	10	6	10
79-00-5-----	1,1,2-Trichloroethane	6	10	6	10
71-43-2-----	Benzene	6	10	6	10
10061-02-6-----	Trans-1,3-Dichloropropene	6	10	6	10
75-25-2-----	Bromoform	6	10	6	10
108-10-1-----	4-Methyl-2-Pentanone	11	10	11	10
591-78-6-----	2-Hexanone	11	10	11	10
127-18-4-----	Tetrachloroethene	6	10	6	10
79-34-5-----	1,1,2,2-Tetrachloroethane	6	10	6	10
108-88-3-----	Toluene	6	10	4	10
108-90-7-----	Chlorobenzene	6	10	6	10
100-41-4-----	Ethylbenzene	6	10	6	10
100-42-5-----	Styrene	6	10	6	10
1330-20-7-----	Total Xylenes	6	10	6	10

FORM I VOA

165

1/87 Rev.

1/87 Rev.

above blk  
range

3D

## SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Matrix Spike - EPA Sample No.: CEN82Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	7670	0	5640	74	26- 90
2-Chlorophenol	7670	0	5180	68	25-102
1,4-Dichlorobenzene	3830	0	2500	65	28 104
N-Nitroso-di-n-prop.(1)	3830	0	2610	68	41 126
1,2,4-Trichlorobenzene	3830	0	2620	68	38 107
4-Chloro-3-methylphenol	7670	0	6020	78	26 103
Acenaphthene	3830	0	3090	81	31-137
4-Nitrophenol	7670	0	8200	107	11-114
2,4-Dinitrotoluene	3830	0	2680	70	28- 89
Pentachlorophenol	7670	0	3890	51	17-109
Pyrene	3830	1150	4550	89	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	7670	5650	74	0	35 26- 90
2-Chlorophenol	7670	5500	72	-6	50 25-102
1,4-Dichlorobenzene	3830	2580	67	-3	27 28 104
N-Nitroso-di-n-prop.(1)	3830	2550	67	1	38 41 126
1,2,4-Trichlorobenzene	3830	2740	72	-6	23 38 107
4-Chloro-3-methylphenol	7670	4910	64	20	33 26 103
Acenaphthene	3830	3470	91	-12	19 31-137
4-Nitrophenol	7670	5700	74	36	50 11-114
2,4-Dinitrotoluene	3830	2940	77	-10	47 28- 89
Pentachlorophenol	7670	3520	46	10	47 17-109
Pyrene	3830	6790	147 *	-49 *	36 35-142

(1) N-Nitroso-di-n-propylamine

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 1 out of 11 outside limitsSpike Recovery: 1 out of 22 outside limitsCOMMENTS: INST ID 1A 830208  
CASE 14399 CEN-82

383

8C

## SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Lab File ID (Standard): A9990Date Analyzed: 07/12/90Instrument ID: 1ATime Analyzed: 0001

	IS4(PHN)		IS5(CRY)		IS6(PRY)	
	AREA #	RT	AREA #	RT	AREA #	RT
12 HOUR STD	927000	24.17	477000	32.59	299000	36.87
UPPER LIMIT	1854000		954000		598000	
LOWER LIMIT	463500		238500		149500	
EPA SAMPLE NO.						
01 CEN76	932000	24.19	301000	32.59	164000	36.89
02 CEN77	1080000	24.19	333000	32.59	185000	36.89
03 CEN78	721000	24.19	✓ 163000 *	32.61	✓ 290300 *	36.92
04 CEN80	720000	24.19	✓ 132000 *	32.62	23% 58800 *	36.91

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal standard area.

LOWER LIMIT = - 50%

of internal standard area.

# Column used to flag internal standard area values with an asterisk

## SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: CLAYTON NOVIContract: 68-D9-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Lab File ID (Standard): A0007Date Analyzed: 07/12/90Instrument ID: 1ATime Analyzed: 2157

	IS4(PHN)		IS5(CRY)		IS6(PRY)	
	AREA #	RT	AREA #	RT	AREA #	RT
12 HOUR STD	140000	24.17	70700	32.57	56100	36.87
UPPER LIMIT	280000		141400		112200	
LOWER LIMIT	70000		35350		28050	
EPA SAMPLE NO.						
01: CEN78RE	94000	24.15	✓ 27600 *	32.57	25% 13800 *	36.87
02: CEN79	131000	24.17	38000	32.57	59% 22100 *	36.87
03: CEN80RE	125000	24.17	✓ 28800 *	32.59	7% 16200 ✓	36.89
04: CEN81	111000	24.19	23% 16600 *	32.59	18% 9840 *	36.91
05: CEN84	143000	24.19	51800	32.59	31100	36.89

Sim to 76 internal

Sim to 80 internal

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal standard area.

LOWER LIMIT = - 50%

of internal standard area.

# Column used to flag internal standard area values with an asterisk

## SEMIVOLATILE INTERNAL STANDARD AREA SUMMARY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Lab File ID (Standard): A0020Date Analyzed: 07/13/90Instrument ID: 1ATime Analyzed: 1452

	IS4 (PHN)		IS5 (CRY)		IS6 (PRY)	
	AREA #	RT	AREA #	RT	AREA #	RT
12 HOUR STD	160000	24.17	58600	32.61	42300	36.91
UPPER LIMIT	320000		117200		84600	
LOWER LIMIT	80000		29300		21150	
EPA SAMPLE NO.						
01 CEN79RE	145000	24.17	30800	32.59	36145100 *	36.89
02 CEN81RE	110000	24.17	22713000 *	32.59	1776990 *	36.92
03 CEN90	145000	24.19	36100	32.64	21800	36.92
04 CEN82MS	115000	24.19	✓ 20800 *	32.59	✓ 11700 *	36.92
05 SBLKW1	119000	24.19	40400	32.62	22500	36.94

Sum to 79 listed  
Sum to 81 listed  
CEN82 fine

IS4 (PHN) = Phenanthrene-d10

IS5 (CRY) = Chrysene-d12

IS6 (PRY) = Perylene-d12

UPPER LIMIT = + 100%

of internal standard area.

LOWER LIMIT = - 50%

of internal standard area.

# Column used to flag internal standard area values with an asterisk

Operator ID: JEFF

Quant Rev: 6

Quant Time: 900717 06:09

Output File: A0050:QT

Injected at: 900717 05:21

Data File: A0050:06

Dilution Factor: 1.00000

Name: INST ID 1A 830208

Misc: CASE 14399 CEN-82MSD IS-40(43810)

BTLE 1

ID File: CLPID1:01

Title: SEMI-VOLATILE HAZARDOUS SUBSTANCES EPA LIST

Last Calibration: 900717 04:52

	Compound	R.T.	Q ion	Area	Conc	Units	q
1)	*1,4-DICHLOROBENZENE-D4 (IS)	10.39	152.0	90840	40.00	ng	87
3)	PHENOL	9.81	94.0	228951	73.73	ng	90
6)	2-CHLOROPHENOL	9.94	128.0	216786	71.74	ng	100
8)	1,4-DICHLOROBENZENE	10.42	146.0	119102	33.65	ng	96
13)	4-METHYLPHENOL	11.81	108.0	21553	9.91	ng	94
14)	N-NITROSO-DI-n-PROPYLAMINE	11.74	70.0	58867	33.22	ng	96
16)	2-FLUOROPHENOL (SS)	7.39	112.0	203322	79.52	ng	100
17)	PHENOL-05 (SS)	9.78	99.0	211019	69.74	ng	100
18)	*NAPHTHALENE-08 (IS)	14.07	136.0	243634	40.00	ng	100
26)	1,2,4-TRICHLOROBENZENE	13.97	180.0	99844	35.83	ng	97
27)	NAPHTHALENE	14.12	128.0	14863	2.16	ng	100
30)	4-CHLORO-3-METHYLPHENOL	16.09	107.0	101358	64.02	ng	100
31)	2-METHYLNAPHTHALENE	16.27	142.0	11027	2.67	ng	107
32)	NITROBENZENE-05 (SS)	12.02	82.0	83621	34.55	ng	95
33)	*ACENAPHTHENE-010 (IS)	19.55	164.0	120806	40.00	ng	94
42)	ACENAPHTHENE	19.65	153.0	178761	45.16	ng	79
44)	4-NITROPHENOL	20.34	109.0	15894	74.37	ng	100
45)	DIBENZOFURAN — add	20.15	168.0	18754	3.69	ng	95
46)	2,4-DINITROTOLUENE	20.38	165.0	40429	38.26	ng	81
50)	FLUORENE — add	21.24	166.0	21696	5.86	ng	99
52)	2-FLUOROBIPHENYL (SS)	17.53	172.0	170807	34.50	ng	100
53)	2,4,6-TRIBROMOPHENOL (SS)	22.07	329.7	56617	71.35	ng	100
54)	*PHENANTHRENE-010 (IS)	24.15	188.0	131229	40.00	ng	100
59)	PENTACHLOROPHENOL	23.86	266.0	20265	45.86	ng	97
60)	PHENANTHRENE	24.24	178.0	201254	51.98	ng	100
61)	ANTHRACENE	24.37	178.0	22671	5.81	ng	100
62)	DI-n-BUTYLPHTHALATE	26.41	149.0	4447	1.07	ng	100
63)	FLUORANTHENE	28.00	202.0	142643	53.51	ng	74
64)	*CHRYSENE-012 (IS)	32.57	240.0	28767	40.00	ng	100
66)	PYRENE	28.70	202.0	172516	88.46	ng	100
67)	BUTYLPHTHALATE	31.09	149.0	1586	2.48	ng	40
69)	BENZOPHANTHRACENE	32.53	228.0	17487	19.01	ng	83
70)	BIS(2-ETHYLHEXYL)PHTHALATE	33.05	149.0	13201	17.54	ng	100
71)	CHRYSENE	32.65	228.0	20483	21.04	ng	90
72)	TERPHENYL-014 (SS)	29.35	244.0	48006	37.51	ng	100
73)	*PERYLENE-012 (IS)	36.87	264.0	17272	40.00	ng	100
74)	DI-N-OCTYLPHTHALATE	34.89	149.0	6895	9.43	ng	100
76)	BENZO(k)FLUORANTHENE — add	35.80	252.0	23974	37.60	ng x 76	75
77)	BENZO(a)PYRENE	36.70	252.0	9564	16.16	ng	95
78)	INDENO(1,2,3-cd)PYRENE	40.74	276.0	1911	3.09	ng	100
79)	DIBENZO(a,h)ANTHRACENE — add	40.86	278.0	683	1.44	ng	100
80)	BENZO(g,h,i)PERYLENE	41.88	276.0	2257	4.68	ng	100

\* Compound is ISTD

07/19/90

-210-16

## SEMIVOLAT ORGANICS ANALYSIS DATA SHEET

REF SAMPLE NO.

EPA SAMPLE NO.

Lab Name: CLAYTON NOVI

Contract: 68-09-0035

CEN80

CENSOR

Lab Code: CLAYTN

Case No.: 14399

SAS No.:

SDG No.: CEN76

IG No.: CEN76

Matrix: (soil/water) SOIL

Lab Sample ID: 830206

#: 830205

Sample wt/vol: 30.0 (g/mL) G

Lab File ID: A9995

AG014

Level: (low/med) LOW

Date Received: 06/28/90

06/28/90

% Moisture: not dec. 16 dec.

Date Extracted: 06/23/90

Id: 06/28/90

Extraction: (SepF/Cont/Sonc)

SONC

Date Analyzed: 07/12/90

1: 07/13/90

GPC Cleanup: (Y/N) Y

pH: 7.1

Dilution Factor: 1.0

for: 1.0

CONCENTRATION UNITS:

§:

CAS NO.

COMPOUND

(ug/L or ug/Kg) U6/K6

C

1K6

Q

99-09-2	3-Nitroaniline	3800	1U	3800	1U
83-32-9	Acenaphthene	790	1U	790	1U
51-28-5	2,4-Dinitrophenol	3800	1U	3800	1U
100-02-7	4-Nitrophenol	3800	1U	3800	1U
132-64-9	Dibenzofuran	790	1U	790	1U
121-14-2	2,4-Dinitrotoluene	790	1U	790	1U
84-66-2	Diethylphthalate	790	1U	790	1U
7005-72-3	4-Chlorophenyl-phenylether	790	1U	790	1U
86-73-7	Fluorene	790	1U	790	1U
100-10-6	4-Nitroaniline	3800	1U	3800	1U
534-52-1	4,6-Dinitro-2-Methylphenol	3800	1U	3800	1U
86-30-6	N-Nitrosodiphenylamine (1)	790	1U	790	1U
101-55-3	4-Bromophenyl-phenylether	790	1U	790	1U
118-74-1	Hexachlorobenzene	790	1U	790	1U
87-86-5	Pentachlorophenol	3800	1U	3800	1U
85-01-8	Phenanthrene	790	1U	790	1U
120-12-7	Anthracene	790	1U	790	1U
84-74-2	Di-n-Butylphthalate	790	1U	790	1U
206-44-0	Fluoranthene	790	1U	790	1U
129-00-0	Pyrene	790	1U	790	1U
85-68-7	Butylbenzylphthalate	790	1U	790	1U
91-94-1	3,3'-Dichlorobenzidine	1600	1U	1600	1U
56-55-3	Benzo(a)Anthracene	790	1U	790	1U
218-01-9	Chrysene	790	1U	790	1U
117-81-7	bis(2-Ethylhexyl)Phthalate	610	1BJ	440	1BJ
117-84-0	Di-n-Octyl Phthalate	790	1U	790	1U
205-99-2	Benzo(b)Fluoranthene	790	1U	790	1U
207-08-9	Benzo(k)Fluoranthene	790	1U	790	1U
50-32-8	Benzo(a)Pyrene	790	1U	790	1U
193-39-5	Indeno(1,2,3-cd)Pyrene	790	1U	790	1U
53-70-3	Dibenz(a,h)Anthracene	790	1U	790	1U
191-24-2	Benzo(g,h,i)Perylene	790	1U	790	1U

(1) - Cannot be separated from Diphenylamine

3D

## SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-D9-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Matrix Spike - EPA Sample No.: CEN83Level: (low/med) MED

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
Phenol	222000	0	116000	52	26- 90
2-Chlorophenol	222000	0	132000	59	25-102
1,4-Dichlorobenzene	111000	0	65300	59	28 104
N-Nitroso-di-n-prop.(1)	111000	0	58200	52	41 126
1,2,4-Trichlorobenzene	111000	0	72700	66	38 107
4-Chloro-3-methylphenol	222000	0	122000	55	26 103
Acenaphthene	111000	0	86400	78	31-137
4-Nitrophenol	222000	0	55600	25	11-114
2,4-Dinitrotoluene	111000	0	82700	75	28- 89
Pentachlorophenol	222000	0	113000	51	17-109
Pyrene	111000	0	90200	81	35-142

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
Phenol	222000	110000	50	4	35 26- 90
2-Chlorophenol	222000	117000	53	11	50 25-102
1,4-Dichlorobenzene	111000	62700	56	5	27 28 104
N-Nitroso-di-n-prop.(1)	111000	59300	53	-2	38 41 126
1,2,4-Trichlorobenzene	111000	68900	62	6	23 38 107
4-Chloro-3-methylphenol	222000	122000	55	0	33 26 103
Acenaphthene	111000	80900	73	7	19 31-137
4-Nitrophenol	222000	118000	53	-72 *	50 11-114
2,4-Dinitrotoluene	111000	77300	70	7	47 28- 89
Pentachlorophenol	222000	92200	42	19	47 17-109
Pyrene	111000	86900	78	4	36 35-142

(1) N-Nitroso-di-n-propylamine

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 1 out of 11 outside limitsSpike Recovery: 0 out of 22 outside limits

COMMENTS:

384

$$CRDL = 760 \text{ ug/kg}$$

CEN82	
11-mephenol	510
naphthalene	100
6-me-naphth	90
acenaphthene	72
phenanthrene	830
anthracene	120
fluoranthene	1300
pyrene	1200
1-methylanthracene	620
Benp	1900 B
fluorene	550
b(b) fluor.	900
k) fluor.	—
h(a) pyrene	370
indeno(1,2,3-d)pyr	94
1-mz(gh)peryl.	220
benzofuran	ND
fluorene	ND
benz(a,h)anthracene	ND

CEN82MS	
	580
	81
	91
	ND
	550
	100
	560
	ms
	270
	1500 B
	280
	650
	—
	240
	100
	80
	ND
	ND
	ND

CEN82MSD		
760		OK
170	< CRCL	OK
200		OK
ND		✓
4000	J	✓
450	< CRCL	< CRCL
4100	J	✓
ms		✓
1500		✓
1300 B		B
1600	J	✓
2900	add J	3Damen ✓
1200		✓
240		< CRCL
360		
280	add	
450	add	
110	add	

## SOIL PESTICIDE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CLAYTON NOVI Contract: 68-09-0035Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: CEN-76Matrix Spike - EPA Sample No.: CEN-82 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
gamma-BHC (Lindane)	61.2	0	72.8	119	46-127
Heptachlor	61.2	0	66.7	109	35-130
Aldrin	61.2	0	70.5	115	34-132
Dieldrin	153	0	179	117	31-134
Endrin	153	0	179	117	42-139
4,4'-DDT	153	0	194	127	23-134

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
gamma-BHC (Lindane)	61.2	59.0	96	21	50 46-127
Heptachlor	61.2	58.4	95	14	31 35-130
Aldrin	61.2	46.3	76	41	43 34-132
Dieldrin	153	158	103	13	38 31-134
Endrin	153	155	101	15	45 42-139
4,4'-DDT	153	153	100	24	50 23-134

\* Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 6 outside limitsSpike Recovery: 0 out of 12 outside limits

COMMENTS:

1084

✓ RH 07/28/90

2F

## SOIL PESTICIDE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-D9-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN-76Level: (low/med) LOW

	EPA	S1	OTHER
	SAMPLE NO.	(DBC)*	
01	PBLKS1	111	0
02	CEN-76	104	0
03	CEN-77	98	0
04	CEN-78	105	0
05	CEN-79	90	0
06	CEN-80	94	0
07	CEN-81	97	0
08	CEN-82	110	0
09	CEN-83	93	0
10	CEN-84	91	0
11	CEN-88	133	0
12	CEN-82MS	109	0
13	CEN-82MSD	102	0

ADVISORY  
QC LIMITS  
( 20-150 )

S1 (DBC) = Dibutylchlorodate

\* Column to be used to flag recovery values

• Values outside of contract required QC limits

D Surrogates diluted out

1083

✓ RH07/23/90

ZE  
WATER PESTICIDE SURROGATE RECOVERY

14399 3-300-01

Lab Name: CLAYTON NOVI Contract: 68-09-0035

Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: CEN-76

	EPA	S1	OTHER
	SAMPLE NO.	(DBC)*	
01	PBLKW1	100	0
02	CEN-90	97	0

ADVISORY  
QC LIMITS  
( 24-154 )

S1 (DBC) = Dibutylchloroendate

\* Column to be used to flag recovery values

\* Values outside of contract required QC limits

D Surrogates diluted out

1082

-RH 07/23/90

PROJECT NAME: St. Elizabeths Hosp.  
TDD NO.: E3-9005-31

EPA SITE NO.: DC 14  
REGION: 3

SUPPORT DOCUMENTATION FOR THE REVIEW OF  
INORGANIC ANALYTICAL DATA PACKAGE

CASE/SAS NO.: 14399  
TYPE OF ANALYSIS: low inorganic  
CONTRACT LABORATORY: RMA  
APPLICABLE IFB OR SOW: 7/88  
REVIEWER: R. Cohen  
REVIEW DATE: Jan 1991

APPLICABLE SAMPLE NO's.:  
MCDT 88, 89, 91, 92 99  
MCT 85, 86, 87, 90 7 solids  
MCDX 29-34

THE FOLLOWING TABLE INDICATES  
AREAS WHICH WERE EXAMINED IN  
DETAIL, THE IDENTIFIED PROBLEM  
AREAS, AND SUPPORT DOCUMENTATION  
ATTACHMENTS:

	AREAS EXAMINED IN DETAIL					PROBLEM AREAS IDENTIFIED					SUPPORT DOCUMENTATION ATTACHMENTS				
	CHECK (✓) IF YES OR FOOTNOTE LETTER FOR COMMENTS BELOW					CHECK (✓) IF YES OR FOOTNOTE NUMBER FOR COMMENTS BELOW					CHECK (✓) IF YES OR IDENTIFY ATTACHMENT NO.				
	ALL APPLICABLE ANALYSES	ICP OR A.A. METALS	FURNACE METALS	COLD VAPOR MERCURY	CYANIDE	ALL APPLICABLE ANALYSES	ICP OR A.A. METALS	FURNACE METALS	COLD VAPOR MERCURY	CYANIDE	ALL APPLICABLE ANALYSES	ICP OR A.A. METALS	FURNACE METALS	COLD VAPOR MERCURY	CYANIDE
HOLDING TIMES	✓														
BLANK ANALYSIS RESULTS	✓														
MATRIX SPIKES (PRE-DIGESTION)	✓														
DUPLICATES	✓														
QUANTITATION OF RESULTS	✓														
DETECTION LIMITS/SENSITIVITY	✓														
INITIAL CALIBRATIONS	✓														
CONTINUING CALIBRATIONS	✓														
LABORATORY CONTROL STANDARDS	✓														
ICP LINEAR RANGE ANALYSIS	✓														
ICP INTERFERENCE CHECKS	✓														
ICP SERIAL DILUTIONS	✓														
GFAA POST-DIGESTION SPIKES	✓														
GFAA DUPLICATE BURNS	✓														
GFAA STANDARD ADDITIONS	✓														
OTHERS	✓														

COMMENTS: \_\_\_\_\_  
\_\_\_\_\_  
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\_\_\_\_\_

14399

## BLANK ANALYSIS RESULTS

TASK	TYPE	CONC	MATRIX	SAMPLE #	SOURCE OF H <sub>2</sub> O	CONTAMINANTS (CONCENTRATION / DETECTION LIMIT)
Metals	Initial cal beks		ICB	lab		NO
	CCBs		ICB	lab		NO
	prep blank		PB Ck aq	lab		Cu 6.74 ug/l * Zn 4.92 ug/l
↓	field blank		MCPT 92	NVS		Ca 86.8 ug/l Fe 92.0 ug/l * Zn 9.8 ↓
Metals	Initial cal beks		ICB	lab		K 408.7 ug/l * Zn 18.1 ug/l *
	contin cal beks		CCB	lab		Ca 181.3 ug/l * Cu 4.3 K 309.2 Zn 11.2 ↓
↓	prep beks		PB Ck sol	lab		Ca 87.8 ug/l K 129.8 Zn 9.8 ↓

LABORATORY REPORTED FIELD BLANK DATA IS COMPARED WITH THE SAMPLE DATA IN A TABULATION FORM WITH SAMPLE ANALYTICAL DATA SUMMARY.

COMMENTS:

- (1) RESULT REPORTED BY LABORATORY AND CONFIRMED BY REVIEWER.
- (2) RESULT INFERRED FROM RAW DATA

3A

## WATER VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: CLAYTON NOVI Contract: 68-09-0035Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: CEN76Matrix Spike - EPA Sample No.: CEN87

COMPOUND	SPIKE ADDED (ug/L)	SAMPLE CONCENTRATION (ug/L)	MS CONCENTRATION (ug/L)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene_____	50.0	0	41.5	83	61-145
Trichloroethene_____	50.0	0	43.8	88	71-120
Benzene_____	50.0	0	47.4	95	76-127
Toluene_____	50.0	0	45.7	91	76-125
Chlorobenzene_____	50.0	0	46.5	93	75-130

COMPOUND	SPIKE ADDED (ug/L)	MSD CONCENTRATION (ug/L)	MSD % REC #	% RPD #	QC LIMITS RPD REC.
1,1-Dichloroethene_____	50.0	41.3	83	0	14 61-145
Trichloroethene_____	50.0	46.1	92	-4	14 71-120
Benzene_____	50.0	44.9	90	5	11 76-127
Toluene_____	50.0	47.0	94	-3	13 76-125
Chlorobenzene_____	50.0	51.0	102	-9	13 75-130

# Column to be used to flag recovery and RPD values with an asterisk

\* Values outside of QC limits

RPD: 0 out of 5 outside limitsSpike Recovery: 0 out of 10 outside limits

COMMENTS:

3-210-07

## EPA SAMPLE NO.

CEN78RE

SDG No.: CEN76

9 ID: 830204

ID: A00012

ed: 06/28/90

dated: 05/28/90

ized: 07/13/90

Factor: 1.0

WITS:  
UG/KG Q

730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
3600	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
730	10
3600	10
730	10
3600	10
730	10
730	10
730	10

14399-3-210-06

210-08

 1C  
 SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

EPA SAMPLE NO.

Lab Name: CLAYTON NOVIContract: 58-09-0035

CEN78

CEN78RE

Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76SDG No.: CEN76Matrix: (soil/water) SOILLab Sample ID: 830204ID: 830204Sample wt/vol: 30.0 (g/mL) 6Lab File ID: A9993

A0012

Level: (low/med) LOWDate Received: 06/28/90ID: 06/28/90% Moisture: not dec. 10 dec. \_\_\_\_\_Date Extracted: 06/28/90ID: 06/28/90Extraction: (SepF/Cont/Sonc) SONCDate Analyzed: 07/12/90ID: 07/13/90GPC Cleanup: (Y/N) YpH: 6.5Dilution Factor: 1.0Factor: 1.0

CAS NO.	COMPOUND	CONCENTRATION UNITS:		Q	S:
		(ug/L or ug/Kg)	UG/KG		UG/KG
99-09-2	3-Nitroaniline	3600	10		3600 10
83-32-9	Acenaphthene	730	10		730 10
51-28-5	2,4-Dinitrophenol	3600	10		3600 10
100-02-7	4-Nitrophenol	3600	10		3600 10
132-64-9	Dibenzofuran	730	10		730 10
121-14-2	2,4-Dinitrotoluene	730	10		730 10
84-66-2	Diethylphthalate	730	10		730 10
7005-72-3	4-Chlorophenyl-phenylether	730	10		730 10
86-73-7	Fluorene	730	10		730 10
100-10-6	4-Nitroaniline	3600	10		3600 10
534-52-1	4,6-Dinitro-2-Methylphenol	3600	10		3600 10
86-30-6	N-Nitrosodiphenylamine (1)	730	10		730 10
101-55-3	4-Bromophenyl-phenylether	730	10		730 10
118-74-1	Hexachlorobenzene	730	10		730 10
87-86-5	Pentachlorophenol	3600	10		3600 10
85-01-8	Phenanthrene	450	10		450 10
120-12-7	Anthracene	75	10		87 10
84-74-2	Di-n-Butylphthalate	310	10	QBB	370 10
206-44-0	Fluoranthene	660	10		820 10
129-00-0	Pyrene	1200	10		1200 10
85-68-7	Butylbenzylphthalate	730	10		730 10
91-94-1	3,3'-Dichlorobenzidine	1500	10		1500 10
56-55-3	Benzo(a)Anthracene	730	10		470 10
218-01-9	Chrysene	580	10		730 10
117-81-7	bis(2-Ethylhexyl)Phthalate	580	10		460 10
117-84-0	Di-n-Octyl Phthalate	730	10		730 10
205-99-2	Benzo(b)Fluoranthene	1000	10		870 10
207-08-9	Benzo(k)Fluoranthene	730	10		500 10
50-32-8	Benzo(a)Pyrene	510	10		510 10
193-39-5	Indeno(1,2,3-cd)Pyrene	290	10		390 10
53-70-3	Dibenz(a,h)Anthracene	100	10		730 10
191-24-2	Benzo(g,h,i)Perylene	350	10		350 10

(1) - Cannot be separated from Diphenylamine

478

## U.S. EPA - CLP

3  
BLANKS

00031

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium	2.0	U	2.0	U	2.0	U	2.0	U			F
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											

## U.S. EPA - CLP

3  
BLANKS

00014

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Preparation Blank Matrix (soil/water): WATERPreparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum	25.0	U	25.0	U	25.0	U	25.0	U	25.000	U	P
Antimony	24.0	U	24.0	U	24.0	U	24.0	U	24.000	U	P
Arsenic											
Barium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Calcium	66.0	U	66.0	U	66.0	U	66.0	U	66.000	U	P
Chromium	5.0	U	5.0	U	5.0	U	5.0	U	5.000	U	P
Cobalt	6.0	U	6.0	U	6.0	U	6.0	U	6.000	U	P
Copper	4.0	U	4.0	U	4.0	U	4.0	U	6.740	B	P
Iron	-23.1	B	22.0	U	22.0	U	22.0	U	22.000	U	P
Lead	20.0	U	20.0	U	20.0	U	20.0	U	20.000	U	P
Magnesium	76.0	U	76.0	U	76.0	U	76.0	U	76.000	U	P
Manganese	8.0	U	8.0	U	8.0	U	8.0	U	8.000	U	P
Mercury											
Nickel	10.0	U	10.0	U	10.0	U	10.0	U	10.000	U	P
Potassium	115.0	U	115.0	U	115.0	U	115.0	U	115.000	U	P
Selenium											
Silver	6.0	U	6.0	U	6.0	U	6.0	U	6.000	U	P
Sodium	1100.0	U	1100.0	U	1100.0	U	1100.0	U	1100.000	U	P
Thallium											
Vanadium	4.0	U	4.0	U	4.0	U	4.0	U	4.000	U	P
Zinc	1.0	U	1.0	U	1.0	U	1.0	U	4.920	B	P
Cyanide											

00017

## U.S. EPA - CLP

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Preparation Blank Matrix (soil/water): WATERPreparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead			1.0	U	1.0	U					F
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium			2.0	U							F
Silver											
Sodium											
Thallium			1.0	U							F
Vanadium											
Zinc											
Cyanide											

SDG MC DT 88 :

samples  
a & uous

MC DT 88  
MC DT 89  
MC DT 91  
MC DT 92

2B  
CRDL STANDARD FOR AA AND ICP

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88AA CRDL Standard Source: BAKERICP CRDL Standard Source: BAKER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0	143.47	119.6	121.73	101.4
Arsenic	10.0	9.70	97.0					
Barium								
Beryllium				10.0	10.87	108.7	10.58	105.8
Cadmium				10.0	10.08	100.8	10.76	107.6
Calcium								
Chromium				20.0	20.62	103.1	18.60	93.0
Cobalt				100.0	105.48	105.5	106.93	106.9
Copper				50.0	53.50	107.0	52.31	104.6
Iron								
Lead	3.0	3.00	100.0	40.0	42.04	105.1	41.41	103.5
Magnesium								
Manganese				30.0	32.81	109.4	29.60	98.7
Mercury								
Nickel				80.0	80.21	100.3	83.08	103.9
Potassium								
Selenium	5.0	4.90	98.0					
Silver				20.0	17.78	88.9	18.27	91.4
Sodium								
Thallium	10.0	10.20	102.0					
Vanadium				100.0	105.93	105.9	104.08	104.1
Zinc				40.0	44.53	111.3	44.08	110.2

## ICP INTERFERENCE CHECK SAMPLE

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88ICP ID Number: JA9000ICS Source: EPA-LV-1287

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum	502000	508000	496559	500651.4	98.6	489917	483296.9	95.1
Antimony			27	70.4		23	32.4	
Arsenic								
Barium		483	9	477.4	98.8	10	463.1	95.9
Beryllium		474	1	475.5	100.3	1	454.8	96.0
Cadmium		909	-8	977.2	107.5	-4	907.2	99.8
Calcium	506000	516000	506994	510945.2	99.0	498822	490303.3	95.0
Chromium		513	22	488.0	95.1	20	469.4	91.5
Cobalt		478	1	462.1	96.7	5	449.2	94.0
Copper		534	7	530.4	99.3	6	514.9	96.4
Iron	196000	203000	181177	183282.2	90.3	179276	176677.8	87.0
Lead		4850	8	4692.2	96.7	4	4602.5	94.9
Magnesium	498000	509000	528107	534434.5	105.0	526725	520865.8	102.3
Manganese		531		471.8	88.8	-3	457.7	86.2
Mercury								
Nickel		916	-5	886.4	96.8	2	869.9	95.0
Potassium			-35	-35.3		-22	-76.1	
Selenium								
Silver		993	-0	952.6	95.9	-1	940.9	94.8
Sodium			-1116	-315.8		-677	-1551.2	
Thallium								
Vanadium		475	6	492.2	103.6	6	477.0	100.4
Zinc		973	4	949.8	97.6	6	925.4	95.1

## SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Level: (low/med) LOW

	EPA	S1	S2	S3	S4	S5	S6	OTHER	TOT
	SAMPLE NO.	(NBZ)#	(FBP)#	(TPH)#	(PHL)#	(2FP)#	(TBP)#		OUT
01	CEN76	67	79	117	71	69	68		0
02	CEN77	62	71	116	66	65	76		0
03	CEN78	65	74	124	74	73	81		0
04	CEN78RE	77	83	119	79	80	78		0
05	CEN79	63	63	95	64	75	72		0
06	CEN79RE	78	81	119	73	79	75		0
07	CEN80	64	73	137	69	67	77		0
08	CEN80RE	62	71	104	66	72	66		0
09	CEN81	60	71	119	60	66	52		0
10	CEN81RE	86	84	134	76	84	65		0
11	CEN82	76	94	100	75	78	93		0
12	CEN84	56	61	85	60	63	67		0
13	CEN88	65	72	82	70	75	68		0
14	CEN82MS	63	70	93	66	74	72		0
15	CEN82MSD	69	69	75	70	80	71		0
16	SBLKS1	78	76	104	73	75	84		0

low areas for  
15 6

low areas for  
15 5+6

QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 ( 23-120 )

S2 (FBP) = 2-Fluorobiphenyl ( 30-115 )

S3 (TPH) = Terphenyl ( 18-137 )

S4 (PHL) = Phenol-d5 ( 24-113 )

S5 (2FP) = 2-Fluorophenol ( 25-121 )

S6 (TBP) = 2,4,6-Tribromophenol ( 19-122 )

OK

\* Column to be used to flag recovery values

\* Values outside of contract required QC limits

0 Surrogates diluted out

Metals As, SeIDL 1, 2 ug/l

U = &lt; IDL

Graphite Furnace Spike Recovery Evaluation Form

Case No.: 14399

Sample ID	Instr. Level Result <u>ug/l</u>	PDS Recovery %	Diluted Result <u>ug/l</u>	Diluted % Recovery %	MSA Result (if needed) <u>ug/l</u>	Final Result Reported <u>mg/kg</u>
MCDT85	18.7	90				4.4 ✓
MCDT85D	19.1	85				4.5 ✓
MCDT85S	48.8	—				75% ✓
MCDT86	12.7	91				2.8 ✓
MCDT87	21.0	86				5.1 ✓
MCDT90	2.8	94				.73 ✓
MCDX29	10.8	86				2.4 ✓
MCDX30	16.9	80			19.5	4.6 ✓
MCDX31	8.6	90				1.9 ✓
MCDX32	9.1	93				2.2 ✓
MCDX33	ND	92				.24 U
MCDX34	2.8	88				.62 ✓
MCDT85	ND	52				U
MCDT85D	ND	54				U
MCDT85S	4.4	—				442 ✓
MCDT86	3.1	38	ND x 10	112		10 = U ✓
MCDT87	ND	84				U
MCDT90	ND	75				U
MCDX29	ND	62				U
MCDX30	ND	69				U
MCDX31	ND	69				U
MCDX32	ND	74				U
MCDX33	ND	72				U
MCDX34	ND	(47)				U

dl  
spl.  
specific

u

## U.S. EPA - CLP

00036

6  
DUPLICATES

EPA SAMPLE NO.

MCPT85D

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCPT85Matrix (soil/water): SOIL Level (low/med): LOW% Solids for Sample: 84.5 % Solids for Duplicate: 84.4Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum		16720.5879	12594.2539	28.2	*	P
Antimony		9.7635	6.6112	38.5		P
Arsenic	2.4	4.3787	4.4970	2.7		F
Barium	47.3	160.8048	140.2275	13.7		P
Beryllium		0.2367	0.4752	200.0		P
Cadmium	1.2	7.1523	5.8675	19.7	*	P
Calcium		23733.8027	21570.4336	9.6		P
Chromium		35.8050	32.5894	9.4		P
Cobalt		10.2946	9.3856	9.2		P
Copper		984.9283	242.0126	121.1	*	P
Iron		25144.0977	26580.3262	5.6		P
Lead		426.6139	713.4216	50.3	*	P
Magnesium	1183	4033.6914	4363.2725	7.9		P
Manganese		319.7744	329.3943	3.0		P
Mercury		0.3550	0.3550	0.0		CV
Nickel		74.0121	70.6810	4.6		P
Potassium	1183	1198.6637	981.7111	19.9		P
Selenium		0.4734	0.4734			F
Silver	2.4	2.5562	1.6771	41.5		P
Sodium	1183	2935.3457	2097.6858	33.3		P
Thallium		0.2367	0.2367			F
Vanadium	11.8	27.9995	29.2630	4.4		P
Zinc		1082.7230	3201.7117	98.9	*	P
Cyanide		0.5917	0.5917			AS

## U.S. EPA - CLP

00037

6  
DUPLICATES

EPA SAMPLE NO.

MCDT85D

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT85Matrix (soil/water): SOIL Level (low/med): LOW% Solids for Sample: 84.5 % Solids for Duplicate: 84.4Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead		640.2367	633.1361	1.1		F
Magnesium						
Manganese						
Mercury						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Thallium						
Vanadium						
Zinc						
Cyanide						

## 8

**Contract: 68-D9-0090**

SDG No. : MCDT85[illegible]

## U.S. EPA - CLP

00041

9  
ICP SERIAL DILUTIONS

EPA SAMPLE NO.

MCDX34L

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT85Matrix (soil/water): SOIL Level (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ- ence	Q	M
Aluminum	25886.11		27327.68		5.6		P
Antimony	29.44	B	120.00	U	100.0		P
Arsenic							
Barium	121.58	B	128.95	B	6.1		P
Beryllium	1.00	U	5.00	U			P
Cadmium	5.00	U	25.00	U			P
Calcium	77846.18		82289.94		5.7		P
Chromium	79.40		83.28		4.9		P
Cobalt	21.49	B	30.00	U	100.0		P
Copper	336.63		358.43		6.5		P
Iron	76985.17		81878.66		6.4		P
Lead	2789.28		2949.08		5.7		P
Magnesium	17780.93		19107.65	B	7.5		P
Manganese	478.74		508.89		6.3		P
Mercury							CV
Nickel	152.87		139.30	B	8.9		P
Potassium	1895.04	B	2363.28	B	24.7		P
Selenium			2363.28				
Silver	6.00	U	30.00	U			P
Sodium	1100.00	U	5500.00	U			P
Thallium							
Vanadium	246.95		261.70		6.0		P
Zinc	2047.12		2242.57		9.5		P

Enseco - Rocky Mountain Analytical Lab  
Mercury Worksheet

Project 00134, 10105

STANDARD CONCENTRATION (ppb)	READING (mV)
BLANK	0.001
S0.2	0.020
S0.5	0.052
S1.0	0.107
S2.0	0.222

SDG No. MCDT85

Case/SAS No. 14399 /NA

Conc./Matrix LOW /SOIL

Analyst R. Persich, H

Date July 16, 1990

Corr. Coef.

BOTTLE	SAMPLE	LIMS SAMPLE	READING (mV)	INITIAL CONCENTRATION (ppb)	D/F	FINAL CONCENTRATION ug/L	COMMENTS
48	ICV		0.102	1.01	5	5.0	2.30
139	ICB		0.000	0.20u	1	0.20u	
210	CCV1		0.108	1.04	1	1.1	
17	CCB1		0.000	0.20u	1	0.2u	
147	PBSS		0.000	0.20u	500	0.10u	
62	LCSS		-	-	500	-	
9	BLANK		0.100	0.99	12500	12.	
21	MCDT85	0101840001SA	0.057	0.56	500	0.30	✓ within 10%
72	MCDT85D	0101840001D	0.060	0.59		0.30	
78	MCDT85S	0101840001S	0.162	1.60		0.80	dropped by lot - mally
97	MCDT86	0101840002SA	0.051	0.50		0.25	.25 = .28
53	MCDT87	0101840003SA	0.043	0.42		0.21	✓ .25 = .28
75	MCDT90	0101840004SA	0.004	0.20u		0.10u	
208	MCDX29	0101840005SA	0.073	0.72		0.40.36	.36 = .39
84	MCDX30	0101840006SA	0.104	1.03	✓	0.52	✓
113	CCV2		0.106	1.05	1	1.0	.52 = .56
151	CCB2		0.004	0.20u	1	0.20u	.22
19	MCDX31	0101840007SA	0.014	0.20	500	0.10u	
119	MCDX32	0101840008SA	0.018	0.20u	1	0.10u	
4	MCDX33	0101840009SA	0.005	0.20u	1	0.10u	
32	MCDX34	0101840010SA	0.010	0.20u	✓	0.10u	
127	10105-17		0.006	0.20u	500	0.10u	
64	-17D		0.010	0.20u	1	0.20u	
68	-17S		0.156	1.54	1	0.80	
211	-18		0.013	0.20u	✓	0.10u	
23	CCV3						
66	CCB3		0.104	1.03	1	1.0	3.00
			0.000	0.20u	1	0.20u	

## U.S. EPA - CLP

3  
BLANKS

00015

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Preparation Blank Matrix (soil/water): WATERPreparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum			25.0	U							P
Antimony			24.0	U							P
Arsenic											
Barium			2.0	U							P
Beryllium			1.0	U							P
Cadmium			5.0	U							P
Calcium			66.0	U							P
Chromium			5.0	U							P
Cobalt			6.0	U							P
Copper			4.0	U							P
Iron			22.0	U							P
Lead			20.0	U							P
Magnesium			76.0	U							P
Manganese			8.0	U							P
Mercury											
Nickel			10.0	U							P
Potassium			115.0	U							P
Selenium											
Silver			6.0	U							P
Sodium			1100.0	U							P
Thallium											
Vanadium			4.0	U							P
Zinc			1.0	U							P
Cyanide			1.0	U							P

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Preparation Blank Matrix (soil/water): WATERPreparation Blank Concentration Units (ug/L or mg/kg): UG/L

Analyte	Initial Calib. Blank (ug/L)		Continuing Calibration Blank (ug/L)						Preparation Blank		M
		C	1	C	2	C	3	C		C	
Aluminum											
Antimony											
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	F
Magnesium											
Manganese											
Mercury	0.2	U	0.2	U	0.2	U			0.200	U	CV
Nickel											
Potassium											
Selenium	2.0	U	2.0	U	2.0	U	2.0	U	2.000	U	F
Silver											
Sodium											
Thallium	1.0	U	1.0	U	1.0	U	1.0	U	1.000	U	F
Vanadium											
Zinc											
Cyanide	10.0	U	10.0	U	10.0	U			10.000	U	AS



3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	F
Magnesium											
Manganese											
Mercury	0.2	U	0.2	U	0.2	U	0.2	U	0.100	U	CV
Nickel											
Potassium											
Selenium	2.0	U	2.0	U	2.0	U			0.400	U	F
Silver											
Sodium											
Thallium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	F
Vanadium											
Zinc											
Cyanide	10.0	U	10.0	U	10.0	U	10.0	U	0.500	U	AS

## U.S. EPA - CLP

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic			1.0	U	1.0	U					F
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead			1.0	U	1.0	U	1.0	U			F
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium			1.0	U							F
Vanadium											
Zinc											
Cyanide											

## U.S. EPA - CLP

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead			1.0	U	1.0	U					F
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium											
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum											
Antimony											
Arsenic											
Barium											
Beryllium											
Cadmium											
Calcium											
Chromium											
Cobalt											
Copper											
Iron											
Lead											
Magnesium											
Manganese											
Mercury											
Nickel											
Potassium											
Selenium	2.0	U	2.0	U	2.0	U					F
Silver											
Sodium											
Thallium											
Vanadium											
Zinc											
Cyanide											

5A  
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT89S

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Matrix (soil/water): WATERLevel (low/med): LOW%Solids for Sample : 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum		130243.9766	103635.9453	SR7SA 2000.00	1330.4	-	P
Antimony	75-125	192.7000	48.0000	500.00	38.5	N	P
Arsenic	75-125	3.4000	1.0000	40.00	8.5	N	F
Barium	75-125	3279.6399	1272.3700	2000.00	100.4	-	P
Beryllium	75-125	145.0600	93.1200	50.00	103.9	-	P
Cadmium	75-125	66.3300	17.5 10.0000	50.00	48 132.7	N	P
Calcium		144223.0156	139298.4375			-	NR
Chromium	75-125	545.1600	357 270.8800	200.00	424 137.1	N	P
Cobalt	75-125	1312.2200	796.7400	500.00	103.1	-	P
Copper	75-125	1201.7500	881 875.7700	250.00	130.4	N	P
Iron		560168.0000	441584.4688	SR7SA 1000.00	11858.4	-	P
Lead	75-125	1900.8101	1364.1699	500.00	107.3	-	P
Magnesium		64844.3203	62754.6328			-	NR
Manganese		9772.7607	8946.8896	SR7SA 500.00	165.2	-	P
Mercury	75-125	1.5000	0.5000	1.00	100.0	-	CV
Nickel	75-125	793.7800	297.3500	500.00	99.3	-	P
Potassium		61954.6602	62635.4922			-	NR
Selenium	75-125	65.7000	4 20.0000	10.00	657.0	N	F
Silver	75-125	37.1800	12.0000	50.00	74.4	N	P
Sodium		1273750.2500	1262832.3750			-	NR
Thallium	75-125	2.6000	10.0000	50.00	5.2	N	F
Vanadium	75-125	1583.5399	4175 870.8100	500.00	4102 142.5	N	P
Zinc		5539.5698	4771.6797	SR7SA 500.00	153.6	-	P
Cyanide	75-125	106.0000	10.0000	100.00	106.0	-	AS

## Comments:

ICP SAMPLE AND SPIKE SAMPLE RESULTS ARE REPORTED AT A 2X DILUTION DUE  
HIGH CONCENTRATIONS OF SODIUM IN SAMPLES.

high recoveries (exc Se) due to accept level of spf.  
inhomogeneity for spf results > 4 x SA.

\* Se - using initial SR (71 ug/l), a 0% recovery is obtained

## U.S. EPA - CLP

00020

5A  
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT89S

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT88Matrix (soil/water): WATER Level (low/med): LOW%Solids for Sample : 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium							
Cobalt							
Copper							
Iron							
Lead		1300.0000	1657.0000	20.00	-1785.0		F
Magnesium							
Manganese							
Mercury							
Nickel							
Potassium							
Selenium							
Silver							
Sodium							
Thallium							
Vanadium							
Zinc							
Cyanide							

## Comments:

LEAD SAMPLE RESULT IS DETERMINED BY MSA.

## U.S. EPA - CLP

00021

5B  
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT89A

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Matrix (soil/water): WATERLevel (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony		237.41	48.00	240.0	98.8		P
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium		29.55	10.00	20.0	147.8		P
Calcium							NR
Chromium		777.83	270.88	540.0	93.9		P
Cobalt							NR
Copper		2564.64	875.77	1750.0	96.5		P
Iron							NR
Lead							NR
Magnesium							NR
Manganese							NR
Mercury							NR
Nickel							NR
Potassium							NR
Selenium							NR
Silver							NR
Sodium							NR
Thallium							NR
Vanadium		2545.29	870.81	1740.0	96.2		P
Zinc							NR
Cyanide							NR

Comments:

## U.S. EPA - CLP

00022

6  
DUPLICATES

EPA SAMPLE NO.

MCDT89D

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT88Matrix (soil/water): WATER Level (low/med): LOW% Solids for Sample: 0.0 % Solids for Duplicate: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S) C	Duplicate (D) C	RPD	Q	M
Aluminum		103635.9453	119119.3594	13.9	-	P
Antimony		48.0000 U	48.0000 U		-	P
Arsenic		1.0000 U	3.1000 B	200.0	-	F
Barium		1272.3700	1251.6300	1.6	-	P
Beryllium		93.1200	89.2700	4.2	-	P
Cadmium		10.0000 U	17.5400	200.0	*	P
Calcium		139298.4375	130311.1719	6.7	-	P
Chromium		270.8800	337.4100	21.9	*	P
Cobalt		796.7400	764.6100	4.1	-	P
Copper		875.7700	881.2300	0.6	-	P
Iron		441584.4688	531629.6875	18.5	-	P
Lead		1364.1699	1299.1001	4.9	-	P
Magnesium		62754.6328	58772.4297	6.6	-	P
Manganese		8946.8896	8446.3496	5.8	-	P
Mercury	0.2	0.5000	0.5000	0.0	-	CV
Nickel		297.3500	301.5800	1.4	-	P
Potassium		62635.4922	56131.8516	11.0	-	P
Selenium		20.0000 U	20.0000 U		-	F
Silver		12.0000 U	12.0000 U		-	P
Sodium		1262832.3750	1153244.8750	9.1	-	P
Thallium		10.0000 U	10.0000 U		-	F
Vanadium		870.8100	1074.5800	20.9	*	P
Zinc		4771.6797	4577.9399	4.1	-	P
Cyanide		10.0000 U	10.0000 U		-	AS

6  
DUPLICATES

EPA SAMPLE NO.

MCDT89D

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT88Matrix (soil/water): WATER Level (low/med): LOW% Solids for Sample: 0.0 % Solids for Duplicate: 0.0Concentration Units (ug/L or mg/kg dry weight): UG/L

Analyte	Control Limit	Sample (S)	C	Duplicate (D)	C	RPD	Q	M
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead		1657.0000		1850.0000		11.0		F
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								
Cyanide								

0.0026

8

**Contract: 68-D9-0090**

SDG No.: MCDT88[illegible]

## U.S. EPA - CLP

00025

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum	25.0	U	25.0	U	25.0	U	25.0	U	5.000	U	P
Antimony	24.0	U	24.0	U	24.0	U	24.0	U	4.800	U	P
Arsenic											
Barium	2.0	U	2.0	U	2.0	U	2.0	U	0.400	U	P
Beryllium	1.0	U	1.0	U	1.0	U	1.0	U	0.200	U	P
Cadmium	5.0	U	5.0	U	5.0	U	5.0	U	1.000	U	P
Calcium	66.0	U	66.0	U	93.5	B	138.8	B	17.564	B	P
Chromium	5.0	U	5.0	U	5.0	U	5.0	U	1.000	U	P
Cobalt	6.0	U	6.0	U	6.0	U	6.0	U	1.200	U	P
Copper	4.0	U	4.0	U	4.0	U	4.3	B	0.800	U	P
Iron	22.0	U	22.0	U	22.0	U	22.0	U	4.400	U	P
Lead	20.0	U	20.0	U	20.0	U	20.0	U	4.000	U	P
Magnesium	76.0	U	76.0	U	76.0	U	76.0	U	15.200	U	P
Manganese	8.0	U	8.0	U	8.0	U	8.0	U	1.600	U	P
Mercury											
Nickel	10.0	U	10.0	U	10.0	U	10.0	U	2.000	U	P
Potassium	408.7	B	115.0	U	115.0	U	194.4	B	25.971	B	P
Selenium											
Silver	6.0	U	6.0	U	6.0	U	6.0	U	1.200	U	P
Sodium	1100.0	U	1100.0	U	1100.0	U	1100.0	U	220.000	U	P
Thallium											
Vanadium	4.0	U	4.0	U	4.0	U	4.0	U	0.800	U	P
Zinc	18.1	B	3.3	B	4.8	B	8.3	B	1.960	B	P
Cyanide											

00026

## U.S. EPA - CLP

3  
BLANKSLab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Preparation Blank Matrix (soil/water): SOILPreparation Blank Concentration Units (ug/L or mg/kg): MG/KG

Analyte	Initial Calib. Blank (ug/L)	C	Continuing Calibration Blank (ug/L)						Prepa- ration Blank	C	M
			1	C	2	C	3	C			
Aluminum			25.0	U	25.0	U					P
Antimony			24.0	U	24.0	U					P
Arsenic											
Barium			2.0	U	2.0	U					P
Beryllium			1.0	U	1.0	U					P
Cadmium			5.0	U	5.0	U					P
Calcium			107.7	U	181.3	U					P
Chromium			5.0	U	5.0	U					P
Cobalt			6.0	U	6.0	U					P
Copper			4.0	U	4.0	U					P
Iron			22.0	U	22.0	U					P
Lead			20.0	U	20.0	U					P
Magnesium			76.0	U	76.0	U					P
Manganese			8.0	U	8.0	U					P
Mercury											
Nickel			10.0	U	10.0	U					P
Potassium			309.2	U	115.0	U					P
Selenium											
Silver			6.0	U	6.0	U					P
Sodium			1100.0	U	1100.0	U					P
Thallium											
Vanadium			4.0	U	4.0	U					P
Zinc			11.2	U	8.3	U					P
Cyanide											

## ICP SERIAL DILUTIONS

MCDT91L

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88Matrix (soil/water): WATERLevel (low/med): LOW

Concentration Units: ug/L

Analyte	Initial Sample Result (I)	C	Serial Dilution Result (S)	C	% Differ- ence	Q	M
Aluminum	92836.91		96483.43		3.9		P
Antimony	48.00	U	240.00	U			P
Arsenic							
Barium	1039.88		1075.82	B	3.6		P
Beryllium	65.86		69.18		5.0		P
Cadmium	10.00	U	50.00	U			P
Calcium	125737.20		130662.70		3.9		P
Chromium	269.95		262.04		2.9		P
Cobalt	584.16		619.58		6.1		P
Copper	659.04		701.97		6.5		P
Iron	420.11		441.87	B	5.2		P
Lead	935.39		973.97		4.1		P
Magnesium	59062.11		61728.02		4.5		P
Manganese	6944.53		7328.87		5.5		P
Mercury							CV
Nickel	237.40		244.21	B	2.9		P
Potassium	55388.33		57466.63		3.8		P
Selenium							
Silver	12.00	U	60.00	U			P
Sodium	1203428.00		1264224.00		5.1		P
Thallium							
Vanadium	853.46		894.76		4.8		P
Zinc	3363.23		3583.47		6.5		P

all ok

## Instrument Detection Limits (Quarterly)

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88ICP ID Number: JA9000Date: 07/15/90Flame AA ID Number: N/A

Furnace AA ID Number: \_\_\_\_\_

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum	237.31		200	25.0	P
Antimony	206.84		60	24.0	P
Arsenic			10		
Barium	233.53		200	2.0	P
Beryllium	313.04		5	1.0	P
Cadmium	228.80		5	5.0	P
Calcium	370.60		5000	66.0	P
Chromium	267.72		10	5.0	P
Cobalt	228.62		50	6.0	P
Copper	324.75		25	4.0	P
Iron	259.84		100	22.0	P
Lead	220.35		3	20.0	P
Magnesium	279.08		5000	76.0	P
Manganese	294.92		15	8.0	P
Mercury	253.70		0.2	0.1	CV
Nickel	231.60		40	10.0	P
Potassium	766.49		5000	115	P
Selenium			5		
Silver	328.07		10	6.0	P
Sodium	330.24		5000	1100	P
Thallium			10		
Vanadium	292.40		50	4.0	P
Zinc	213.80		20	1.0	P

## Comments:

SPECTRO PRODUCTS HG-3 SPECTROPHOTOMETER USED FOR MANUAL COLD VAPOR  
DETERMINATION. (INSTRUMENT B)

## Instrument Detection Limits (Quarterly)

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT88

ICP ID Number: \_\_\_\_\_

JA9000Date: 07/15/90

Flame AA ID Number: \_\_\_\_\_

N/AFurnace AA ID Number: PE2380

Analyte	Wave-length (nm)	Back-ground	CRDL (ug/L)	IDL (ug/L)	M
Aluminum			200		
Antimony			60		
Arsenic	193.70	BD	10	2.0	F
Barium			200		
Beryllium			5		
Cadmium			5		
Calcium			5000		
Chromium			10		
Cobalt			50		
Copper			25		
Iron			100		
Lead	283.30	BD	3	1.0	F
Magnesium			5000		
Manganese			15		
Mercury			0.2		
Nickel			40		
Potassium			5000		
Selenium	196.03	BD	5	2.0	F
Silver			10		
Sodium			5000		
Thallium	276.80	BD	10	1.0	F
Vanadium			50		
Zinc			20		

2nd AA

1

1

2

## Comments:

SPECTRO PRODUCTS HG-3 SPECTROPHOTOMETER USED FOR MANUAL COLD VAPOR  
DETERMINATION. (INSTRUMENT B)

00082

Page 1 of

**Case/SAS No.** 14331/NA

Matrix/Conc. WATER

Background Correction BD

Concentration	Abs. / Conc
---------------	-------------

S	0.0	0.000
---	-----	-------

S 10.0 0.058

S	50.0	47.6
---	------	------

Concentration	Abs./Conc
S 0.0	0.000
S 10.0	0.058
S 50.0	47.6
S 100.0	95.3

[illegible]

00080

Enseco-RMAL

Se Graphite Furnace Worksheet

Page 1 of

Project 010183

SDG No. MCDT88

Case/SAS No. 14399/NA

Analyst EN

Date 07/26/90

Matrix/Conc. WATER

Instrument 2380E

Element Se Background Correction BD

## CALIBRATION INFORMATION:

Calibration Time: 02:21

Std. Prep Date: 07/25/90

Std. Prep Time: 08:00

Concentration	Abs./Conc
S 0.0	0.000
S 10.0	0.079
S 50.0	41.9
S 100.0	111.3

ID	SAMPLE	CONC1 (ppb)	CONC2 (ppb)	AV C. (ppb)	%RSD	DF	FINAL CONC ug/L	COMMENTS	TIME
1	ICV	48.6	49.7	49.2	1.64	1	49.2	ICV-2	02:31
2	ICB	2U	2U	2U	NC				02:34
3	CRA	4.9	4.9	4.9	0.18				02:37
4	CCV1	51.1	53.2	52.1	2.77				02:40
5	CCB1	2U	2U	2U	NC				02:42
6	PBW	2U	2U	2U	NC	1	2U		
7	PBWA	10.4	10.4	10.4	0.00			104%	
8	LCSW	50.3	52.7	51.5	3.31	1	51.5		
9	LCSWA	66.5	67.7	67.1	1.24			156%	
10	MCDT88	2U	2U	2U	NC	1	2UW		
11	MCDT88A	12.8	12.4	12.6	2.21			126%	
12	MCDT89	72.9	69.5	71.2	3.35	1	NOT USED	NEEDS DILUTION	
13	MCDT89A	69.8	62.8	66.3	7.49			0%	
14	MCDT89D	67.8	59.9	63.8	8.78	1	NOT USED	NEEDS DILUTION	
15	MCDT89DA	64.0	66.8	65.4	3.09			16%	
16	CCV2	52.5	52.5	52.5	0.03				03:12
17	CCB2	2U	2U	2U	NC				03:15
18	MCDT89S	62.4	69.0	65.7	7.15	1	65.7	0%	03:17
19	MCDT91	70.7	67.9	69.3	2.85	1	NOT USED	NEEDS DILUTION	
20	MCDT91A	67.3	63.9	65.6	3.57			0%	
21	MCDT92	2U	2U	2U	NC	1	2U		
22	MCDT92A	9.6	9.9	9.7	1.87			97%	
23	MCDT89	2U	2.4	2U	NC	10	20U		
24	MCDT89A	11.0	11.8	11.4	5.23			114%	
25	MCDT89D	2U	2U	2U	NC	10	20U		
26	MCDT89DA	10.6	10.8	10.7	1.36			107%	
27	CCV3	52.9	53.6	53.2	0.96				03:45
28	CCB3	2U	2U	2U	NC				03:48
29	MCDT91	2.6	2.9	2.7	6.35	10	27.0B		
30	MCDT91A	11.4	12.0	11.7	3.36			90%	
31	CCV4	54.6	53.1	53.9	1.98				03:56
32	CCB4	2U	2U	2U	NC				03:59
33									
34									
35									

see  
reagent

SIDG MCDT 85 :

SOLID  
SAMPLES

MCDT 85-87  
MCDT 90  
MCDT 29-34

2B  
CRDL STANDARD FOR AA AND ICP

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85AA CRDL Standard Source: BAKERICP CRDL Standard Source: BAKER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony				120.0	120.70	100.6	117.11	97.6
Arsenic	10.0	10.40	104.0					
Barium								
Beryllium				10.0	9.99	99.9	9.58	95.8
Cadmium				10.0	10.33	103.3	9.61	96.1
Calcium								
Chromium				20.0	21.58	107.9	21.28	106.4
Cobalt				100.0	106.91	106.9	102.90	102.9
Copper				50.0	53.24	106.5	57.40	114.8
Iron								
Lead	3.0	1.50	50.0	40.0	28.35	70.9	49.37	123.4
Magnesium								
Manganese				30.0	31.47	104.9	32.25	107.5
Mercury								
Nickel				80.0	85.75	107.2	84.13	105.2
Potassium								
Selenium	5.0	6.90	138.0					
Silver				20.0	19.13	95.7	19.30	96.5
Sodium								
Thallium	10.0	10.30	103.0					
Vanadium				100.0	104.82	104.8	102.28	102.3
Zinc				40.0	42.55	106.4	42.35	105.9

5/2

2B  
CRDL STANDARD FOR AA AND ICP

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCPT85AA CRDL Standard Source: BAKERICP CRDL Standard Source: BAKER

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium	5.0	5.60	112.0					
Silver								
Sodium								
Thallium								
Vanadium								
Zinc								

2B  
CRDL STANDARD FOR AA AND ICP

Lab Name: ROCKY MOUNTAIN ANALYTICAL  
 Lab Code: ENSECO Case No.: 14399  
 AA CRDL Standard Source: BAKER  
 ICP CRDL Standard Source: BAKER

Contract: 68-D9-0090  
 SAS No.: \_\_\_\_\_ SDG No.: MCDT85

Concentration Units: ug/L

Analyte	CRDL Standard for AA			CRDL Standard for ICP				
	True	Found	%R	True	Initial Found	%R	Final Found	%R
Aluminum								
Antimony								
Arsenic								
Barium								
Beryllium								
Cadmium								
Calcium								
Chromium								
Cobalt								
Copper								
Iron								
Lead								
Magnesium								
Manganese								
Mercury								
Nickel								
Potassium								
Selenium								
Silver	5.0	4.90	98.0					
Sodium								
Thallium								
Vanadium								
Zinc								

## ICP INTERFERENCE CHECK SAMPLE

Lab Name: ROCKY MOUNTAIN ANALYTICALContract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCPT85ICP ID Number: JA9000ICS Source: EPA-LV-1287

Concentration Units: ug/L

Analyte	True		Initial Found			Final Found		
	Sol. A	Sol. AB	Sol. A	Sol. AB	%R	Sol. A	Sol. AB	%R
Aluminum	502000	508000	483938	439327.6	86.5	477640	439964.0	86.6
Antimony			39	46.3		46	56.1	
Arsenic								
Barium		483	10	417.4	86.4	11	424.8	88.0
Beryllium		474	-0	412.5	87.0	-0	428.5	90.4
Cadmium		909	-1	842.5	92.7	2	845.9	93.1
Calcium	506000	516000	498637	456474.6	88.5	500244	464450.4	90.0
Chromium		513	25	426.4	83.1	27	437.4	85.3
Cobalt		478	4	406.2	85.0	2	415.3	86.9
Copper		534	9	472.3	88.4	9	474.6	88.9
Iron	196000	203000	173383	158849.5	78.3	174523	162540.8	80.1
Lead		4850	9	4227.2	87.2	3	4283.2	88.3
Magnesium	498000	509000	513150	466105.9	91.6	504252	462708.4	90.9
Manganese		531	10	422.0	79.5	9	420.1	79.1
Mercury								
Nickel		916	-0	775.7	84.7	-1	794.0	86.7
Potassium			137	19.1		75	57.4	
Selenium								
Silver		993		845.5	85.1	-0	843.1	84.9
Sodium			-279	-1406.6		-245	-453.9	
Thallium								
Vanadium		475	10	436.2	91.8	10	442.6	93.2
Zinc		973	-9	827.4	85.0	-10	832.2	85.5

5A  
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT85S

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Matrix (soil/water): SOILLevel (low/med): LOW%Solids for Sample : 84.5Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum		10735.2842	16720.5879				NR
Antimony	75-125	71.0049	9.7635	118.34	61.8	N	P
Arsenic	75-125	11.5976	4.3787	9.47	76.2		F
Barium	75-125	560.4064	160.8048	473.37	84.4		P
Beryllium	75-125	11.2139	0.2367	11.83	94.8		P
Cadmium	75-125	14.9880	$\Delta=5.87$ 7.1523	11.83	$\Delta=7.7$ 66.2	N	P
Calcium		24955.0664	23733.8027				NR
Chromium	75-125	68.4584	$\Delta=52.6$ 35.8050	47.34	$\Delta=7.0$ 69.0	N	P
Cobalt	75-125	111.2920	10.2946	118.34	85.3		P
Copper		201.6310	$\Delta=242$ 984.9283	59.17	-1323.8		P
Iron		19873.3535	25144.0977				NR
Lead	75-125	1126.2765	$\Delta=5713$ 426.6139	118.34	$\Delta=35\%$ 591.2	N	P
Magnesium		4502.1948	4033.6914				NR
Manganese	75-125	370.2120	319.7744	118.34	42.6	N	P
Mercury	75-125	0.9467	0.3550	0.59	100.3		CV
Nickel	75-125	141.3804	74.0121	118.34	56.9	N	P
Potassium		1113.6906	1198.6637				NR
Selenium	75-125	1.0414	0.4734	2.37	43.9	N	F
Silver	75-125	11.3867	2.5562	11.83	74.6	N	P
Sodium		2045.0529	2935.3457				NR
Thallium	75-125	10.2959	0.2367	11.83	87.0		F
Vanadium	75-125	128.0041	27.9995	118.34	84.5		P
Zinc		1475.7349	1082.7230	$\Delta=75\%$ 118.34	332.1		P
Cyanide	75-125	0.6036	0.5917	0.59	10.2	N	AS

Comments:

(lab added 10ug/L to solid spk)

$$m_n: 370 - 118 = 252$$

$$RPD(252, 319) = 23\%$$

$$m_i: 141 - 118 = 23$$

$$RPD(23, 74) = 105\%$$

00034

## U.S. EPA - CLP

5A  
SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT85S

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECO Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: MCDT85Matrix (soil/water): SOIL Level (low/med): LOW%Solids for Sample : 84.5Concentration Units (ug/L or mg/kg dry weight): MG/KG

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SK) C	Spike Added (SA)	%R	Q	M
Aluminum							
Antimony							
Arsenic							
Barium							
Beryllium							
Cadmium							
Calcium							
Chromium							
Cobalt							
Copper							
Iron							
Lead		501.7751	640.2367	6875A 4.73	-2927.3		F
Magnesium							
Manganese							
Mercury							
Nickel							
Potassium							
Selenium							
Silver							
Sodium							
Thallium							
Vanadium							
Zinc							
Cyanide							

Comments:

Metals Cd, Se, Tl, PbIDLs 1, 2, 11 ug/l

U = &lt; IDL

Graphite Furnace Spike Recovery Evaluation Form

Case No.: 14399

Sample ID	Instr. Level Result <u>ug/l</u>	PDS Recovery <u>%</u>	Diluted Result <u>ug/l</u>	Diluted PDS Recovery <u>%</u>	MSA Result (if needed) <u>ug/l</u>	Final Result Reported <u>ug/l</u>	
MCDT88	ND	119				1 U	✓
MCDT89	ND	131				1 U	✓
MCDT89D	3.1	116				3.1	
MCDT89S	3.5	—	indicated 3.4	—		8.8%	DL 7
MCDT91	2.3	112				2.3	✓ L
MCDT92	ND	110				1 U	✓
MCDT88	ND	126				2 U	✓
MCDT89	71.2	—	2.7 (10x)	72		27	L
MCDT89D	63.8	16	2.8 (10x)	66		28	L
MCDT89S	65.7	—				390%	0% with initial
MCDT91	69.3	0	27 x 10	90		27	
MCDT92	ND	97				2 U	
MCDT88	ND	74				1 U	
MCDT89	1.9	0	ND (10x)	64		10 U	
MCDT89D	1.8	0	ND (10x)	65		10 U	
MCDT89S	2.5	—	(3.7 NO dil'n)			3%	
MCDT91	1.8	0	ND (10x)	63		10 U	
MCDT92	ND	106				1 U	
MCDT88	3.6	89				3.6	✓ 1CP
MCDT89	hi	hi	60.3 x 20	122	1657	1360	1360
MCDT89D	hi	hi	63.5 x 20	128	1850	1300	1300
MCDT89S	hi	hi	65.2 x 20	—		9777 SA	(P=107%)
MCDT91	hi	hi	49 x 20	124	1208	935	935
MCDT92	ND	111				1 U	✓

1CP reported for  
MCDT89, 89 Dup,  
89 SA + 91

Metal Pb, TlIDL 1 ug/l

U &lt; IDL

Case No.: 14399

Graphite Furnace Spike Recovery Evaluation Form

PFE

Sample ID	Instr. Level Result <u>ug/l</u>	PDS Recovery %	Diluted Result <u>ug/l</u>	Diluted PDS Recovery %	MSA Result (if needed) <u>ug/l</u>	Final Result Reported <u>mg/kg</u>	
<b>MCDT85</b>	hi	hi	36.7 x 50	118	2700 = 640 <sup>mg</sup> / <sub>kg</sub>	427	427
<b>MCDT85D</b>	hi	hi	36.5 x 50	116	2680 = 635 <sup>mg</sup> / <sub>kg</sub>	713	713
<b>MCDT85S</b>	hi	hi	42.4 x 50			-	3502
<b>MCDT86</b>	hi	hi	44 x 20	105		147	376
<b>MCDT87</b>	hi	hi	54.9 x 20	112		265	291
<b>MCDT90</b>	58.4	54	54.7 <sup>(NO diln)</sup>	82	85.6	223	15.5
<b>MCDX29</b>	hi	hi	33.1 x 50	101		360	296
<b>MCDX30</b>	hi	hi	64.6 x 50	94		762	2000
<b>MCDX31</b>	hi	hi	33.3 x 10	88		73	83.3
<b>MCDX32</b>	hi	hi	34.3 x 10	102		85	58.1
<b>MCDX33</b>	26.9	88				64	13.0
<b>MCDX34</b>	hi	hi	31.7 x 10	116	302 <sup>(30)</sup>	66	614
<b>MCDT85</b>	ND	101				U	
<b>MCDT85D</b>	ND	101				U	
<b>MCDT85S</b>	43.6	—				87%	
<b>MCDT86</b>	ND	92				U	
<b>MCDT87</b>	ND	112					
<b>MCDT90</b>	ND	113					
<b>MCDX29</b>	ND	102					
<b>MCDX30</b>	ND	93					
<b>MCDX31</b>	ND	102					
<b>MCDX32</b>	ND	110					
<b>MCDX33</b>	ND	112					
<b>MCDX34</b>	ND	92				✓	

## U.S. EPA - CLP

00035

5B  
POST DIGEST SPIKE SAMPLE RECOVERY

EPA SAMPLE NO.

MCDT85A

Lab Name: ROCKY MOUNTAIN ANALYTICAL Contract: 68-D9-0090Lab Code: ENSECOCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: MCDT85Matrix (soil/water): SOILLevel (low/med): LOW

Concentration Units: ug/L

Analyte	Control Limit %R	Spiked Sample Result (SSR) C	Sample Result (SR) C	Spike Added (SA)	%R	Q	M
Aluminum							NR
Antimony		132.26	41.25	120.0	75.8		P
Arsenic							NR
Barium							NR
Beryllium							NR
Cadmium		86.37	30.22	60.0	93.6		P
Calcium							NR
Chromium		411.19	151.28	305.0	85.2		P
Cobalt							NR
Copper							NR
Iron							NR
Lead		5103.83	1802.44	3600.0	91.7		P
Magnesium							NR
Manganese		3729.40	1351.05	2700.0	88.1		P
Mercury							NR
Nickel		353.51	312.70	60.0	68.0		P
Potassium							NR
Selenium							NR
Silver							NR
Sodium							NR
Thallium							NR
Vanadium							NR
Zinc							NR
Cyanide		196.00	10.00	200.0	98.0		AS

Comments:

## SEMIVOLATILE ORGANICS ANALYSIS DATA SHEET

LAB SAMPLE NO.

ENV SAMPLE NO.

CEN79

CEN79RE

Lab Name: CLAYTON NOVI Contract: 68-09-0035Lab Code: CLAYTN Case No.: 14399 SAS No.: \_\_\_\_\_ SDG No.: CEN76Matrix: (soil/water) SOIL Lab Sample ID: 830205Sample wt/vol: 30.0 (g/mL) 6 Lab File ID: A0013Level: (low/med) LOW Date Received: 06/28/90% Moisture: not dec. 53 dec. 23 Date Extracted: 06/28/90Extraction: (SepF/Cont/Sonc) SONC Date Analyzed: 07/13/90GPC Cleanup: (Y/N) Y pH: 5.7 Dilution Factor: 1.0

CAS NO. COMPOUND CONCENTRATION UNITS:  
(ug/L or ug/Kg) UG/KG Q

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) <u>UG/KG</u>	Q
99-09-2	3-Nitroaniline	4200 IU	
83-32-9	Acenaphthene	860 IU	
51-28-5	2,4-Dinitrophenol	4200 IU	
100-02-7	4-Nitrophenol	4200 IU	
132-64-9	Dibenzofuran	860 IU	
121-14-2	2,4-Dinitrotoluene	860 IU	
84-66-2	Diethylphthalate	860 IU	
7005-72-3	4-Chlorophenyl-phenylether	860 IU	
86-73-7	Fluorene	860 IU	
100-10-6	4-Nitroaniline	4200 IU	
534-52-1	4,6-Dinitro-2-Methylphenol	4200 IU	
86-30-6	N-Nitrosodiphenylamine (1)	860 IU	
101-55-3	4-Bromophenyl-phenylether	860 IU	
118-74-1	Hexachlorobenzene	860 IU	
87-86-5	Pentachlorophenol	4200 IU	
85-01-8	Phenanthrene	630 IU	
120-12-7	Anthracene	170 IU	
84-74-2	Di-n-Butylphthalate	860 IU	
206-44-0	Fluoranthene	720 IU	
129-00-0	Pyrene	1100 IU	
85-68-7	Butylbenzylphthalate	860 IU	
91-94-1	3,3'-Dichlorobenzidine	1700 IU	
56-55-3	Benzo(a)Anthracene	440 IU	
218-01-9	Chrysene	450 IU	
117-81-7	bis(2-Ethylhexyl)Phthalate	1100 IU	
117-84-0	Di-n-Octyl Phthalate	860 IU	
205-99-2	Benzo(b)Fluoranthene	650 IU	
207-08-9	Benzo(k)Fluoranthene	310 IU	
50-32-8	Benzo(a)Pyrene	460 IU	
193-39-5	Indeno(1,2,3-cd)Pyrene	250 IU	
53-70-3	Dibenz(a,h)Anthracene	860 IU	
191-24-2	Benzo(g,h,i)Perylene	150 IU	

(1) - Cannot be separated from Diphenylamine

## EPA SAMPLE NO.

CEN76RE

IG No.: CEN75

: 830235

**E0926**

06/28/90

1: 07/07/90

or: 1.0

K6 Q

123

## EPA SAMPLE NO.

CEN77DL

06 No. : CEN76

U: 830238

E0938

**D: 06/28/90**

b: 07/07/90

for: 1.0

7K6 Q

24	10
24	10
24	10
24	10
380	180 ✓
110	180 ✓
280	10
12	10
12	10
12	10
12	10
12	10
24	10
12	10
12	10
12	10
12	10
12	10
12	10
12	10
12	10
12	10
24	10
24	10
52	10 ✓
12	10
55	10
12	10
12	10
12	10
13	10

2C

## WATER SEMIVOLATILE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-09-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76

EPA	S1	S2	S3	S4	S5	S6	OTHER	TOT
SAMPLE NO.	(NBZ)*	(FBP)*	(TPH)*	(PHL)*	(ZFP)*	(TBP)*		OUT
01 CEN90	39	45	96	23	42	63		0
02 SBLKW1	38	47	87	20	38	41		0

## QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 ( 35-114 )  
 S2 (FBP) = 2-Fluorobiphenyl ( 43-116 )  
 S3 (TPH) = Terphenyl ( 33-141 )  
 S4 (PHL) = Phenol-d5 ( 10-94 )  
 S5 (ZFP) = 2-Fluorophenol ( 21-100 )  
 S6 (TBP) = 2,4,6-Tribromophenol ( 10-123 )

\* Column to be used to flag recovery values

\* Values outside of contract required QC limits

0 Surrogates diluted out

380

## SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: CLAYTON NOVIContract: 68-D9-0035Lab Code: CLAYTNCase No.: 14399

SAS No.: \_\_\_\_\_

SDG No.: CEN76Level: (low/med) MED

EPA	S1	S2	S3	S4	S5	S6	OTHER	TOT
SAMPLE NO.	(NBZ)*	(FBP)*	(TPH)*	(PHL)*	(2FP)*	(TBP)*		OUT
01: CEN83	58	64	69	57	67	68		0
02: CEN83MS	56	66	75	56	65	70		0
03: CEN83MSD	56	58	70	49	55	62		0
04: SBLKM1	58	66	89	61	68	74		0

## QC LIMITS

S1 (NBZ) = Nitrobenzene-d5 ( 23-120 )  
 S2 (FBP) = 2-Fluorobiphenyl ( 30-115 )  
 S3 (TPH) = Terphenyl ( 18-137 )  
 S4 (PHL) = Phenol-d5 ( 24-113 )  
 S5 (2FP) = 2-Fluorophenol ( 25-121 )  
 S6 (TBP) = 2,4,6-Tribromophenol ( 19-122 )

OK

\* Column to be used to flag recovery values  
 \* Values outside of contract required QC limits  
 D Surrogates diluted out